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REMEDIAL INVESTIGATION REPORT FOR SITE 9, AND 10 NAS WHITING FIELD FL

1/1/1999

HARDING LAWSON ASSOCIATES

REMEDIAL INVESTIGATION REPORT

SITE 9, WASTE FUEL DISPOSAL PIT AND SITE 10, SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

UNIT IDENTIFICATION CODE: N605508
CONTRACT NO.: N62467-89-D-0317/116

JANUARY 1999

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
NORTH CHARLESTON, SOUTH CAROLINA
29418

PRINTED ON RECYCLED PAPER

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REMEDIAL INVESTIGATION REPORT

SITE 9, WASTE FUEL DISPOSAL PIT
AND
SITE 10, SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

Unit Identification Code: N60508

Contract No.: N62467-89-D-0317/116

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January 1999

CERTIFICATION OF TECHNICAL
DATA CONFORMITY (MAY 1987)

The Contractor, Harding Lawson Associates, hereby certifies that, to the best of its knowledge and belief, the technical data delivered herewith under Contract No. N62467-89-D-0317/116 are complete and accurate and comply with all requirements of this contract.

DATE: January 15, 1999

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(DFAR 252.227-7036)

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PMW.01.99

FOREWORD

To meet its mission objectives, the U.S. Navy performs a variety of operations, some requiring the use, handling, storage, or disposal of hazardous materials. Through accidental spills and leaks and conventional methods of past disposal, hazardous materials may have entered the environment in ways unacceptable by today's standards. With growing knowledge of the long-term effects of hazardous materials on the environment, the Department of Defense initiated various programs to investigate and remediate conditions related to suspected past releases of hazardous materials at their facilities.

One of these programs is the Installation Restoration (IR) program. This program complies with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA), the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments of 1984. These acts establish the means to assess and clean up hazardous waste sites for both private-sector and Federal facilities. The CERCLA and SARA acts form the basis for what is commonly known as the Superfund program.

Originally, the Navy's part of this program was called the Naval Assessment and Control of Installation Pollutants (NACIP) program. Early reports reflect the NACIP process and terminology. The Navy eventually adopted the program structure and terminology of the standard IR program.

The IR program is conducted in several stages as follows:

- preliminary assessment (PA)
- site inspection (SI) (formerly the PA and SI steps were called the initial assessment study under the NACIP program),
- remedial investigation and feasibility study, and
- remedial design and remedial action.

Southern Division, Naval Facilities Engineering Command implement the IR program while the U.S. Environmental Protection Agency and the Florida Department of

Environmental Protection (formerly Florida Department of Environmental Regulation) oversee the Navy environmental program at Naval Air Station (NAS) Whiting Field. All aspects of the program are conducted in compliance with State and Federal regulations, as ensured by the participation of these regulatory agencies.

Questions regarding the CERCLA program at NAS Whiting Field should be addressed to Ms. Linda Martin, Code 1859, at (843) 820-5574.

EXECUTIVE SUMMARY

A remedial investigation and feasibility study is being conducted at Naval Air Station (NAS) Whiting Field in Milton, Florida, by Southern Division, Naval Facilities Engineering Command as part of the Department of Defense Installation Restoration (IR) program. The IR program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations.

A phased approach was implemented to conduct the Remedial Investigation (RI). Phase I was completed in May 1992. The subsequent phases of the RI were designated as Phase IIA and Phase IIB. Fieldwork for Phase IIA was completed in March 1994. Fieldwork for RI Phase IIB was completed in November 1996.

This RI Report contains the results of assessment activities used to characterize site-specific chemicals detected in environmental media at Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A) at NAS Whiting Field. Data obtained from these activities were used to evaluate the nature and extent of contamination, prepare baseline risk assessments (human health and ecological), and support feasibility studies (if required) at the sites.

Site 9 is located along the eastern facility boundary near the South Air Field and is approximately 2 acres in size. During the 1950s and 60s, waste fuel (i.e., aviation gasoline) containing tetraethyl lead was reportedly disposed of in the northern part of Site 9. According to anecdotal information, a tanker truck was used to transport waste fuel to the disposal pit where it was drained. Approximately 200 to 300 gallons of waste fuel were disposed of at the site per trip. The total quantity of fuel disposed of at the site is unknown. The approximate location of the disposal pit was determined based on a geophysical survey conducted during the Phase IIA fieldwork (1992).

Site 10 is contiguous to Site 9 and is approximately 4 acres in size. From 1965 to 1973, this site was used for the disposal of inert wastes such as construction debris, trees, brush, metal cans, and similar materials not suitable for sanitary landfill disposal. Transformer oil and empty pesticide/herbicide containers were also reportedly disposed of at the site. Access to the site was uncontrolled and other potentially hazardous wastes may have been disposed of at the site. The approximate locations of the disposal areas were determined based on a geophysical survey conducted during the RI Phase IIA fieldwork (1992).

Currently, Sites 9 and 10 consist of overgrown shrubs and planted pine trees, approximately 25 to 40 feet in height. Construction debris is present on the ground surface at the sites.

The fieldwork conducted during the RI included the following tasks:

- geophysical survey,
- soil gas survey,
- surface soil sampling,
- subsurface soil sampling,
- surface water sampling,
- monitoring well installation,
- groundwater sampling, and

- geologic and hydrogeologic investigations.

Soil, surface water, and groundwater samples were analyzed for target compound list organic analytes, and target analyte list inorganic analytes. The following conclusions are based on the RI at Site 9, Waste Fuel Disposal Pit and Site 10, Southeast Open Disposal Area (A) at NAS Whiting Field:

- Soil at Sites 9 and 10 is moderately permeable, fine-graded clayey sand and silty sand, with minor to moderate amounts of humic material. Clay and sand layers were encountered to depths up to 155 feet below land surface (bls), the maximum depth of the investigation at the sites.

- A geophysical survey suggested the presence of buried wastes at Sites 9 and 10. The survey identified two minor disposal areas at Site 9 and one major disposal area at Site 10.

- Site 9 contains a surface depression in the same location as the suspected disposal pit where standing water (i.e., ponding) has been observed. This low area accumulates stormwater runoff and creates saturated soil conditions at the surface during heavy rainfall periods.

- The water table is approximately 80 to 92 feet bls at Site 9 and approximately 82 to 87 feet bls at Site 10. The groundwater flow direction is southeast across Sites 9 and 10. The average horizontal seepage velocity for Sites 9 and 10 and additional Southeast Disposal Area sites is approximately 27 feet per year (ft/yr).

- The pH values for some groundwater samples collected from Sites 9 and 10 monitoring wells were outside the Florida secondary drinking water range of 6.5 to 8.5 standard units.

- The data generated during the RI meet established Data Quality Objectives and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures.

- At Site 9, the total excess lifetime cancer risk (ELCR) associated with exposure to soil by a hypothetical future resident (3×10^{-5}) exceeded Florida's target risk level of concern (1×10^{-6}) due to arsenic and, therefore, may pose an unacceptable risk. The hazard index (HI) of 4 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1, due to iron antimony, arsenic, and aluminum.

- At Site 10, the total ELCR associated with exposure to soil by a potential future resident (5×10^{-5}), occupational worker (3×10^{-6}), and trespasser (3×10^{-6}) exceeded Florida's target risk level of concern (1×10^{-6}) due to carcinogenic polynuclear aromatic hydrocarbons (PAHs) and arsenic. The HI of 3 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1, due to iron, aluminum, arsenic, total petroleum hydrocarbons, and Aroclor-1254.

- At Sites 9 and 10, the background levels of arsenic exceed Florida Soil Cleanup Target Levels and may result in an unacceptable carcinogenic risk.

- At Site 9, ingestion of groundwater may pose an unacceptable risk to humans due to arsenic concentration; however, the risk does not exceed the U.S. Environmental Protection Agency target risk range.

- At Site 9, direct and indirect ingestion of surface soil containing aluminum by small mammals resulted in a potential sublethal risk such as reduction in growth and reproduction.

- At Site 10, potential reduction in the growth and reproduction of small mammals and birds is associated with ingestion of Aroclor-1254, aluminum, cadmium, and zinc in the surface soil.

- At Site 10, elevated total recoverable petroleum hydrocarbons concentration in surface soil is the only ecological chemical of potential concern (CPC) detected that may contribute to significant reduction in earthworm growth.

- At Sites 9 and 10, groundwater is the dominant transport pathway for migration of CPCs off site. Based on an average horizontal seepage velocity of 27 ft/yr, approximate 40-year site history, and evaluation of hydrogeologic data, a potential migration distance for CPCs is estimated to be approximately 770 feet; however, there is no evidence to support that chemicals are migrating from the site.

- Although groundwater analytical results, summaries, and conclusions are included in the RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, facilitywide groundwater). Therefore, chemicals in the groundwater that pose a threat to human and ecological receptors will be evaluated as part of the Site 40 RI and Feasibility Study (FS). The Site 40 assessment will supersede the evaluation presented in this report.

Based on the conclusions of the remedial investigation, a feasibility study for surface soil is recommended for Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A). Groundwater contamination will be addressed in a basewide groundwater investigation under a separate operable unit identified as Site 40. No further action is recommended for the subsurface soil and surface water.

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GLOSSARY

ABB-ES	ABB Environmental Services, Inc.
ARAR	applicable or relevant and appropriate requirement
BAF	bioaccumulation factor
BAT	Bengt-Arne-Torstensson
BCF	bioconcentration factor
bls	below land surface
BTOC	below top of casing
BTX	benzene, toluene, and xylenes
°C	degrees Celsius
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
cm/sec	centimeters per second
CO_2	carbon dioxide
CPC	chemicals of potential concern
CRDL	contract-required detection limit
CRQL	contract-required quantitation limits
CT	central tendency
CWA	Clean Water Act
%D	percent difference
DDE	dichlorodiphenyldichloroethylene
DDD	dichlorodiphenyldichloroethane
DDT	dichlorodiphenyltrichloroethane
DQO	data quality objective
ECPC	ecological chemicals of potential concern
EDB	ethylene dibromide
ELCR	excess lifetime cancer risk
EM	electromagnetic
EPC	exposure point concentration
ERA	ecological risk assessment
FAC	Florida Administrative Code
FDEP	Federal Department of Environmental Protection
FS	Feasibility Study
ft/day	feet per day
ft/ft	feet per foot
ft/yr	feet per year
g/mole	grams per mole
GCTL	groundwater cleanup target levels
GIR	General Information Report
HASP	Health and Safety Plan
HEAST	Health Effects Assessment Summary Tables
HHCPC	human health chemicals of potential concern

HHRA	human health risk assessment
HI	hazard index
HLA	Harding Lawson Associates
HQ	hazard quotient
HRS	Hazard Ranking System
IAS	Initial Assessment Study
IDL	instrument detection limit
IR	Installation Restoration
IRIS	Integrated Risk Information System
LD_{50}	lethal dose to 50 percent of test population
LDC	Laboratory Data Consultants, Inc.
LOAEL	lowest observed adverse effects level
MAG	magnetometry
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/ℓ	milligrams per liter
MS/MSD	matrix spike and matrix spike duplicate
msl	mean sea level
μg/kg	micrograms per kilogram
μg/ℓ	micrograms per liter
μmhos/cm	micromhos per centimeter
NAS	Naval Air Station
NCP	National Oil and Hazardous Substances Contingency Plan
NEESA	Naval Energy and Environmental Support Activity
NFA	no further action
NOAEL	no observable adverse effects level
NPL	National Priority List
NTU	nephelometric turbidity unit
O_2	oxygen
OVA	organic vapor analyzer
PA	Preliminary Assessment
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
PCPT	piezocone penetrometer test
PDE	potential dietary exposure
ppm	parts per million
QA	quality assurance
QC	quality control
QAPP	Quality Assurance Program Plan
RBC	Risk-Based Concentrations
RGO	remedial goal option
RI	Remedial Investigation

RME	reasonable maximum exposure
RPD	relative percent difference
RTV	reference toxicity value
RRF	relative response factor
%RSD	Relative Standard Deviation (%RSD
SARA	Superfund Amendments and Reauthorization Act
SCTLs	soil cleanup target levels
SDG	sample delivery group
SFF	site foraging frequency
SI	Site Inspection
SOUTHNAV-FACENGCOM	Southern Division, Naval Facilities Engineering Command
SQL	sample quantitation limit
SU	standard unit
SVOC	semivolatile organic compound
TAL	target analyte list
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDS	total dissolved solids
TPH	total petroleum hydrocarbons
TRPH	total recoverable petroleum hydrocarbons
TOVC	total organic vapor concentration
UCL	upper confidence limit
UXB	UXB International, Inc.
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
VOC	volatile organic compound

1.0 INTRODUCTION

Harding Lawson Associates (HLA), under contract to the Department of the Navy, Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) is submitting the Remedial Investigation (RI) Report for Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A), at Naval Air Station (NAS) Whiting Field located in Milton, Florida. The RI Report for Sites 9 and 10 is one in a series of site-specific reports being completed in conjunction with the NAS Whiting Field General Information Report (GIR) (HLA, 1998) to summarize the previous investigations and to present the results of the RI.

The Remedial Investigation and Feasibility Study (RI/FS) is being conducted on behalf of the Navy at Whiting Field under Contract No. N62467-89-D-0317. The RI was conducted in three phases: the Phase I RI field program was completed in May 1992; the Phase IIA RI field program was conducted between May 1992 and March 1994; and the Phase IIB RI field program was completed in November 1996.

Installation Location and Description. NAS Whiting Field is located in Santa Rosa County, in Florida's northwest coastal area, approximately 7 miles north of Milton and 20 miles northeast of Pensacola (Figure 1-1). NAS Whiting Field presently consists of two air fields separated by an industrial area. The installation consists of approximately 2,560 acres. Figure 1-2 presents the installation layout and locations of RI/FS sites at NAS Whiting Field. A complete description of historic operations at the facility is presented in Section 1.3 of the NAS Whiting Field GIR (HLA, 1998).

1.1 PURPOSE OF THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY.

The purpose of the NAS Whiting Field RI is to identify and characterize the nature and extent of chemicals in environmental media on site and to identify potential risks to human and ecological receptors that might be posed by toxic or hazardous chemicals present on site. Chemicals were potentially released to the environment during past waste disposal practices or spills. The data collected during the RI field program may also be used in an FS to screen, evaluate, and select remedial alternatives to provide permanent, feasible solutions to environmental impacts that may be a result of past waste disposal practices or spills.

1.2 SITE DESCRIPTION.

This section separately describes each site.

Site 9 - Waste Fuel Disposal Pit. Site 9, located along the eastern facility boundary near the South Air Field (Figure 1-2), is approximately 2 acres in size (Figure 1-3). During the 1950s and 60s, waste fuel (i.e., aviation gasoline) containing tetraethyl lead was reportedly disposed of in the northern part of Site 9. According to anecdotal information, a tanker truck was used to transport waste fuel to the disposal pit where it was drained. Approximately 200 to 300 gallons of waste fuel were disposed of at the site per trip. The total quantity of fuel disposed of at the site is unknown. Furthermore, the precise location of the disposal pit is unknown; however, the approximate location of the disposal pit is shown on Figure 1-3 based on a geophysical survey conducted during Phase IIA fieldwork (ABB-ES, 1992a).

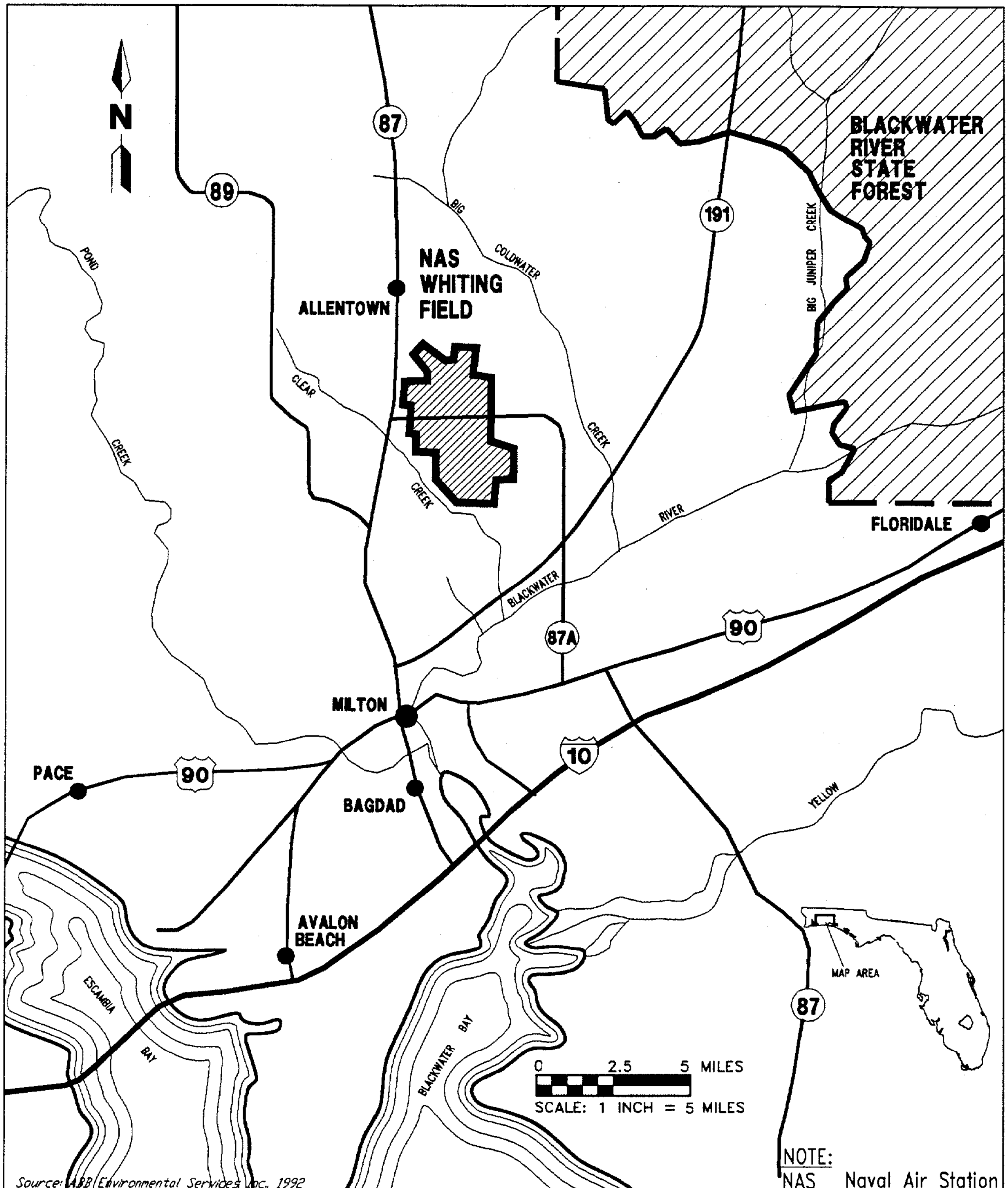

FIGURE 1-1
FACILITY LOCATION MAP

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD
MILTON, FLORIDA

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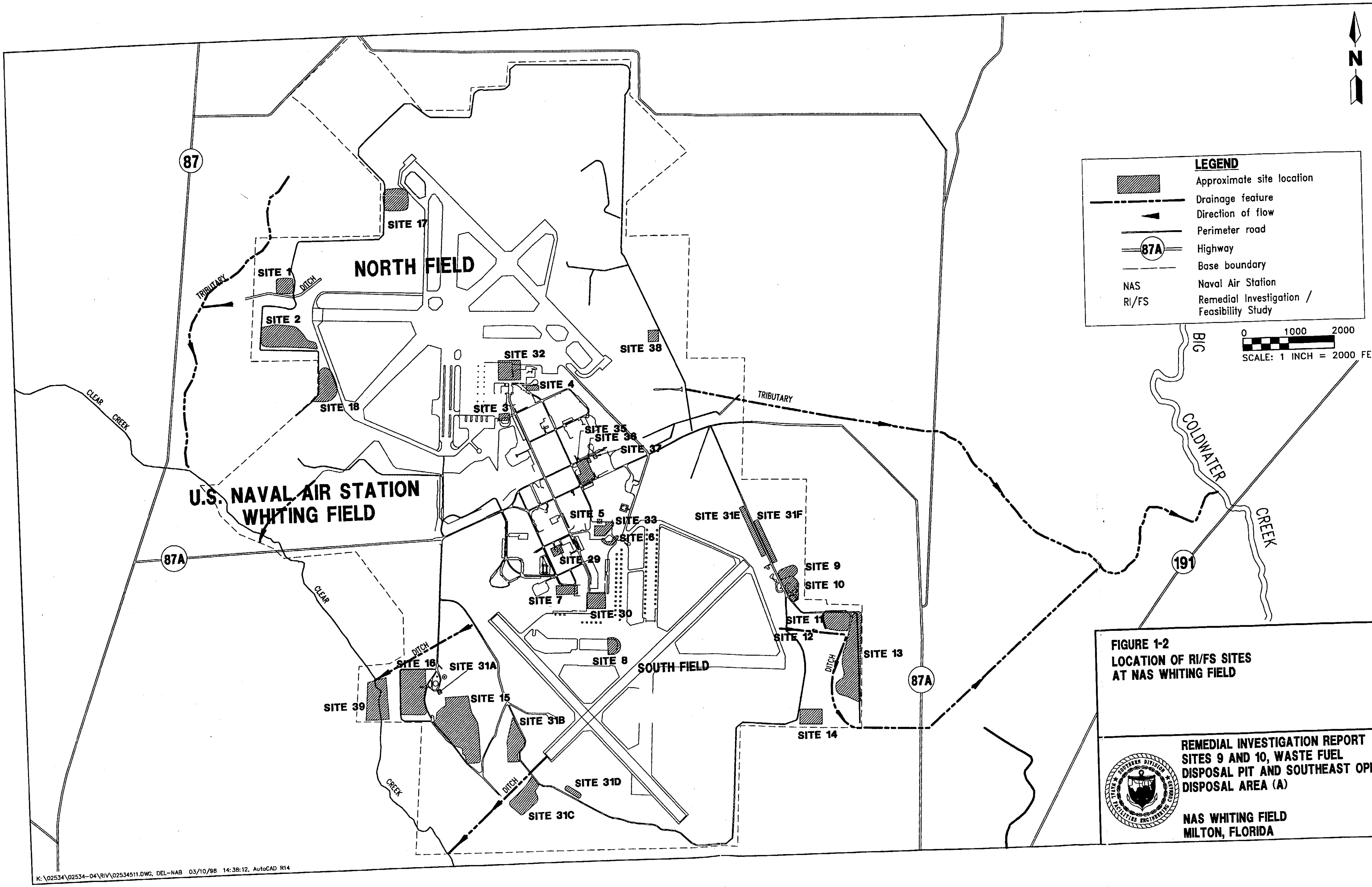

FIGURE 1-2
LOCATION OF RI/FS SITES AT NAS WHITING FIELD

REMEDIAL INVESTIGATION REPORT SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD MILTON, FLORIDA

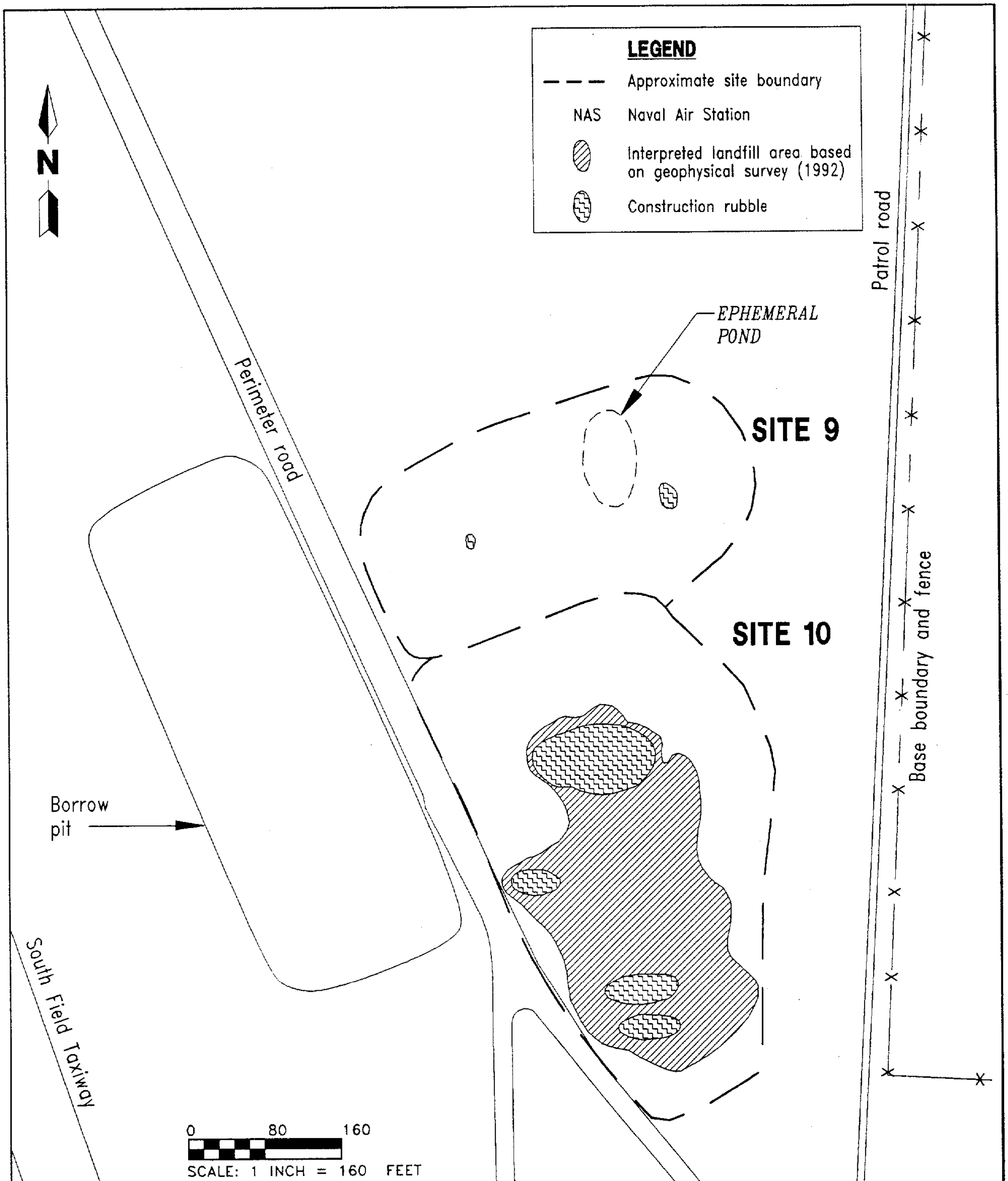

FIGURE 1-3
LOCATION MAP

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REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD
MILTON, FLORIDA

Site 9 is currently forested with pine trees that are approximately 25 to 40 feet in height with construction debris present on the ground surface. Site 9 contains a surface depression in the same location as the suspected disposal pit where standing water (i.e., ponding) has been observed. This low area accumulates stormwater runoff and creates saturated soil conditions at the surface during heavy rainfall periods.

According to the U.S. Department of Agriculture (USDA) (1980), the soil at Site 9 is classified as Troup loamy sand and Fuquay loamy sand. Storm water ponds in the Site 9 depression and gradually infiltrates into the soil.

Site 10 - Southeast Disposal Area (A). Site 10 is contiguous to Site 9 and is approximately 4 acres in size (Figure 1-3). From 1965 to 1973, this site was used for the disposal of inert wastes such as construction debris, trees, brush, metal cans, and similar materials not suitable for sanitary landfill disposal. Transformer oil and empty pesticide/herbicide containers were also reportedly disposed of at the site. Access to the site was uncontrolled and other potentially hazardous wastes may have been disposed of at the site.

The precise locations of the disposal areas at Site 10 are unknown; however, the approximate location of the disposal areas are shown on Figure 1-3 based on a geophysical survey conducted during the RI Phase IIA fieldwork (ABB-ES, 1992a).

The site currently consists of overgrown shrubs and planted pine trees, approximately 25 to 40 feet in height. Construction debris is present on the ground surface at the site.

According to the USDA (1980), the soil at Site 10 is classified as Troup loamy sand. Because the soil at the site is predominantly silty sand, stormwater infiltrates directly into the soil.

1.3 **REGULATORY SETTING**. The Navy Installation Restoration (IR) program was designed to identify and abate or control contaminant migration resulting from past operations at naval installations. The IR program is the Navy response authority under Section 120 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Executive Order 12580. CERCLA requires that Federal facilities comply with the act, both procedurally and substantively. SOUTHNAVFACENGCOM is the agency responsible for the Navy IR program in the southeastern United States. Therefore, SOUTHNAVFACENGCOM has the responsibility to process NAS Whiting Field through preliminary assessment (PA), site inspection (SI), RI/FS, and remedial response selection in compliance with the guidelines of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300).

Section 105(a)(8)(A) of SARA requires the U.S. Environmental Protection Agency (USEPA) to develop criteria to set priorities for remedial action for chemicals detected in environmental media based on relative risk to human health and the environment. To meet this requirement, USEPA has established the Hazard Ranking System (HRS) as Appendix A to the NCP. First promulgated in 1982, HRS was amended on March 14, 1991 (55 Federal Register No. 241:51532-51667), to comply with the requirements of Section 105(c)(1) of SARA to increase the accuracy of the assessment of relative risk. HRS (March 1991) has been substantially revised and is designed to prioritize sites after the SI phase of the CERCLA process.

The HRS score for NAS Whiting Field was generated in 1993. The score was sufficient to place NAS Whiting Field on the National Priority List (NPL). In January 1994, the USEPA placed NAS Whiting Field on a proposed list of sites to be included on the NPL (40 CFR 300, Federal Register, 18 January 1994), and on May 31, 1994, NAS Whiting Field was placed on the NPL effective June 30, 1994 (40 CFR 300, Federal Register, May 31, 1994). As a result, the RI/FS for NAS Whiting Field must follow the requirements of the NCP, as amended by SARA, and regulatory guidance for conducting RI/FS programs under CERCLA.

<u>1.4 REPORT ORGANIZATION</u>. The RI Report is organized into nine chapters (Chapters 1.0 to 9.0). Chapter 1.0 presents the purpose, site description, and regulatory setting for the RI at NAS Whiting Field. Chapter 2.0 summarizes previous investigations. Chapter 3.0 presents the investigative methodology for conducting the assessment. Chapter 4.0 presents the site-specific data quality assessment. Chapter 5.0 discusses the investigative results of the assessment. Chapter 6.0 presents the Human Health Risk Assessment (HHRA), and Chapter 7.0 presents the Ecological Risk Assessment (ERA). Chapter 8.0 discusses the fate and transport of chemicals determined to be human and/or ecological chemicals of potential concern (ECPC). Chapter 9.0 provides a summary of the conclusions and recommendations. Chapter 10.0 presents the professional review certification.

2.0 PREVIOUS INVESTIGATIONS

Numerous investigations have been conducted at NAS Whiting Field prior to this RI report. These investigations include an Initial Assessment Study (IAS), Verification Study, Phase I of the RI, and Phase IIA and IIB of the RI. This chapter summarizes the previous investigations specific to Sites 9 and 10 at NAS Whiting Field.

2.1 INITIAL ASSESSMENT STUDY. Background information was gathered for the IAS (Envirodyne Engineers, Inc., 1985) by conducting a record search, performing an on-site survey, and conducting interviews with long-time employees and retired personnel familiar with the site. Interviews with facility personnel and record reviews indicated that prior to the 1970s most of the hazardous wastes were reportedly disposed of at various disposal pits on base.

During the 1950s and 60s, waste fuel (i.e., aviation gasoline) containing tetraethyl lead was reportedly disposed of in the northern part of Site 9. According to anecdotal information, a tanker truck was used to transport waste fuel to the disposal pit where it was drained. From 1965 to 1973, Site 10 was used as an open disposal area primarily for construction and demolition debris. Wastes disposed of at Site 10 include construction debris, trees, brush, metal cans, and similar materials not suitable for sanitary landfill disposal. Transformer oil and empty pesticide/herbicide containers were also reportedly disposed of at the site (Envirodyne Engineers, Inc., 1985).

Envirodyne Engineers, Inc., recommended in the IAS that Sites 9 and 10 warranted further investigation under the Navy's IR program to assess potential long-term impacts. A Confirmation Study was recommended in the IAS for Sites 9 and 10 which included sampling and monitoring of environmental media to confirm the presence or absence of suspected contamination. The Confirmation Study would typically consist of two parts: Verification and Characterization; however, only the Verification Study was conducted.

2.2 VERIFICATION STUDY. The Verification Study (Geraghty & Miller, 1986) provided an assessment of the physical and chemical conditions existing at Sites 9 and 10.

Site 9. The Verification Study (Geraghty & Miller, 1986) at Site 9 included the collection of six surface soil samples, six subsurface soil samples, and one groundwater sample from a monitoring well installed on site (WHF-9-1). The locations of the soil samples are shown on Figure 2-1. The monitoring well was installed to a depth of approximately 118 feet below top of casing (BTOC) along the eastern edge of the site (Figure 2-1). Groundwater elevation data collected in 1992 and 1993 (ABB-ES, 1995c) for the area suggest that the well was located hydraulically crossgradient to the site.

The soil samples were analyzed for total lead, toxicity characteristic leaching procedure (TCLP) lead, and three volatile organic compounds (VOCs) - benzene, toluene, and xylene (BTX). Soil sample results for total lead ranged from 9 milligrams per kilogram (mg/kg) to 14 mg/kg; however, the results from the TCLP

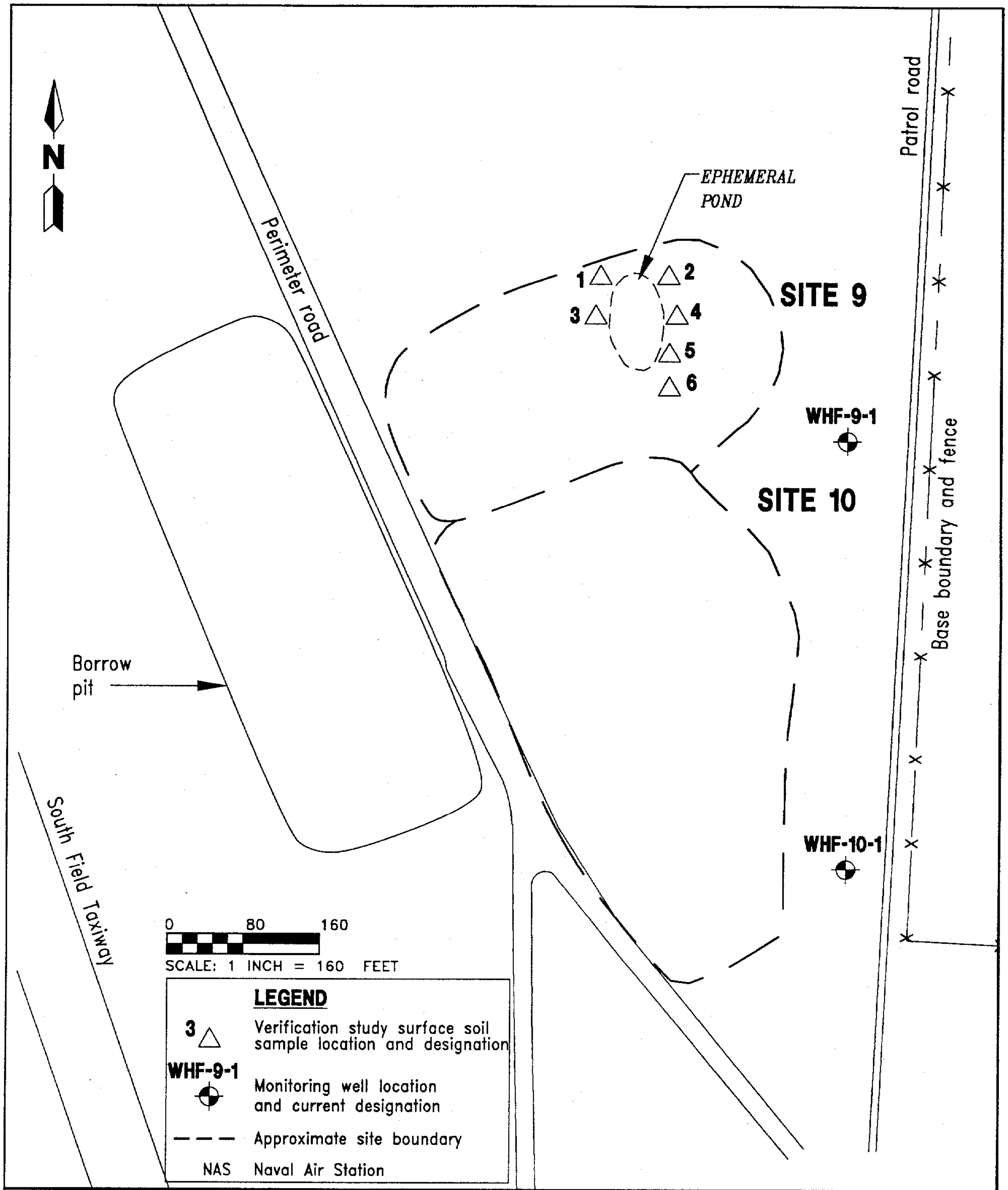

FIGURE 2-1
LOCATION OF VERIFICATION STUDY SURFACE SOIL SAMPLES AND MONITORING WELLS

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REMEDIAL INVESTIGATION REPORT SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD MILTON, FLORIDA

lead tests did not indicate the presence of lead above the detection limit of 0.01 milligrams per liter (mg/ℓ). BTX was not detected in any of the surface and subsurface soil samples.

The groundwater sample was analyzed for BTX, ethylene dibromide (EDB), and total lead. Lead was detected at a concentration below Florida's primary drinking water regulation (Chapter 17-22.104, Florida Administrative Code [FAC]) that was in effect in 1986. BTX and EDB compounds were not detected in the groundwater sample.

Site 10. The Verification Study (Geraghty & Miller, 1986) at Site 10 included the installation of one monitoring well (WHF-10-1) and collection of a groundwater sample for laboratory analyses. The monitoring well was installed to a depth of approximately 118 feet BTOC along the eastern edge of the site (Figure 2-1).

Groundwater elevation data collected in 1992 and 1993 (ABB-ES, 1995c) for the area suggest that the well was located hydraulically crossgradient to the site. The groundwater sample was collected and analyzed for USEPA priority pollutants and additional herbicide compounds. Organic compounds were not detected in the sample. Three inorganic analytes (lead, zinc, and silver) were detected in the groundwater sample; however, the concentrations were below Florida's primary drinking water regulation (Chapter 17-22.104, FAC) that was in effect in 1986.

The conclusion from the Verification Study indicated that a Characterization Study was needed to further investigate the nature and extent of contamination at Sites 9 and 10; however, the IR program was modified in 1987-88 to be congruent with CERCLA and SARA regulatory requirements. As a result, the existing investigations (IAS, Verification Study) were used to support the updated program. Specifically, the IAS and Verification Study functioned as the PA/SI, and the Characterization Study was not performed.

2.3 RI PHASE I INVESTIGATION, 1990-92. In December 1990, HLA under contract to the Department of the Navy, SOUTHNAVFACENGCOM, initiated an RI at NAS Whiting Field. The objective of Phase I of the RI was to characterize the nature and extent of contamination at sites identified during the IAS. The Phase I RI program addressed 14 of 18 previously identified sites at the installation.

Site 9. The RI Phase I investigation at Site 9 included the collection of a groundwater sample using a piezocone penetrometer (PCPT) and Bengt-Arne-Torstensson (BAT) sampler and installation of one monitoring well (WHF-9-2). The WHF-9-2 well location is shown on Figure 2-2. A groundwater sample was collected from WHF-9-CPT-1 at 100 feet below land surface (bls) and analyzed for VOCs and target analyte list (TAL) inorganic analytes at an off-site laboratory. Acetone and carbon disulfide were the only organic compounds detected in the sample, but were interpreted to be artifacts resulting from decontamination procedures. Nine inorganic analytes were also detected. Detailed results are summarized in the RI Phase I Technical Memorandum No. 5 (ABB-ES, 1992b).

WHF-9-2 was installed to an intermediate depth of 120 feet bls. An *in situ* groundwater permeability test was conducted to assess hydraulic properties. No groundwater sample was collected for laboratory analysis.

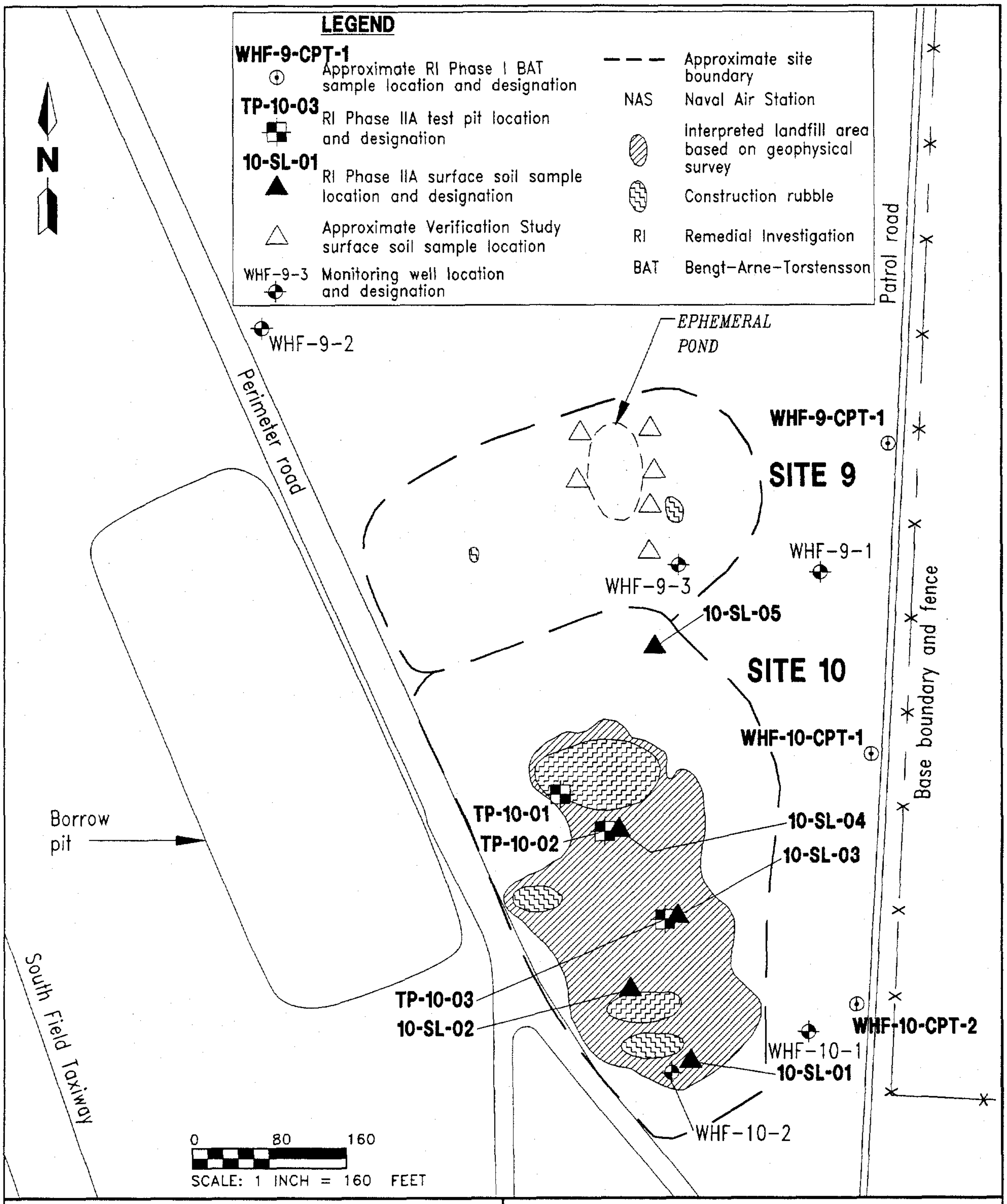

FIGURE 2-2
LOCATION OF SURFACE SOIL SAMPLES, TEST PITS, MONITORING WELLS, AND BAT SAMPLES DURING PHASE I AND IIA

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Site 10. The RI Phase I investigation at Site 10 consisted of the collection of three groundwater samples using a PCPT and BAT sampler. Samples were collected from two different locations (Figure 2-2). A single groundwater sample was collected from 102 feet bls at WHF-CPT-1. Samples were collected from 102 feet bls and 152 feet bls at WHF-CPT-2. The samples were analyzed for VOCs and TAL inorganic analytes at an off-site laboratory. Acetone was detected in two samples, but was interpreted to be an artifact resulting from decontamination procedures. Six inorganic analytes were also detected. Detailed results are summarized in the RI Phase I Technical Memorandum No. 5 (ABB-ES, 1992b).

2.4 RI PHASE IIA INVESTIGATION, 1992-94. In 1992, HLA under contract to the Department of the Navy, SOUTHNAVFACENGCOM, initiated Phase IIA of the RI at NAS Whiting Field. The objective of Phase IIA of the RI was to characterize site-specific and facilitywide contamination at NAS Whiting Field that had been identified during Phase I of the RI.

Site 9. One monitoring well (WHF-9-3) was installed during the Phase IIA investigation. The newly installed monitoring well and two existing monitoring wells at the site were sampled and analyzed for target compound list (TCL) VOCs, semivolatile organic compounds (SVOCs), pesticides and polychlorinated biphenyls (PCBs), and TAL inorganic analytes (Figure 2-2). A summary of the analytical results is provided in Subsection 5.7.2 of this report.

Groundwater elevation data collected in 1992 and 1993 (ABB-ES, 1995c) for the area suggested that WHF-9-2 is located hydraulically upgradient of the site; WHF-9-1 is hydraulically crossgradient; and WHF-9-3 is hydraulically downgradient.

Site 9 was subsequently studied during Phase IIB of the RI. The field investigative methodology for the RI is presented in Chapter 3.0 of this report.

Site 10. The RI Phase IIA investigation included the completion of a geophysical survey, collection of five surface soil samples and three subsurface soil samples from test pits, installation of one monitoring well, and collection of two groundwater samples (Figure 2-2).

The geophysical survey identified three anomalies at the site. One anomaly was interpreted to be a disposal area in the southern half of the site with definitive lateral boundaries. The other two anomalies were small and low in amplitude and were identified as ferromagnetic inorganic analytes present at or near the land surface (ABB-ES, 1993).

Both surface and subsurface soil samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, TAL inorganic analytes, and total recoverable petroleum hydrocarbons (TRPH). A summary of the analytical results is presented in Section 5.5 (surface soil) and Section 5.6 (subsurface soil) of this report.

During the Phase IIA investigation, a second monitoring well (WHF-10-2) was installed and groundwater samples were collected from both monitoring wells WHF-10-1 and WHF-10-2 (Figure 2-2). Samples were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, and TAL inorganic analytes. A summary of the analytical results are provided in Subsection 5.7.2 of this report.

Groundwater elevation data collected in 1992 and 1993 (ABB-ES, 1995b) for the area suggests that monitoring well WHF-10-1 is located hydraulically crossgradient to the site, and WHF-10-2 is located hydraulically downgradient.

Site 10 was subsequently studied during Phase IIB of the RI. The field investigative methodology for the RI is presented in Chapter 3.0 of this report.

3.0 FIELD INVESTIGATIVE METHODS

Field investigative methods to collect data during the RI are described in the RI/FS Planning Document, Volume II (E.C. Jordan, 1990), which provides descriptions of sampling methods, field personnel responsibilities, sample management, chain of custody, project documentation, change in field methods, protocols on corrective actions, decontamination procedures, waste management handling, and other general project standards and procedures in Section 3.1, General Site Operations.

Field and laboratory quality assurance and quality control (QA/QC) requirements for the RI activities comply with the RI/FS Quality Assurance Project Plan (QAPP) located in Appendix A of the RI/FS Planning Document, Volume II (E.C. Jordan, 1990). Health and safety requirements were in accordance with the general Health and Safety Plan (HASP) located in Volume III of the RI/FS Planning Document (E.C. Jordan, 1990).

Field investigative methods not covered in the documents identified above are described in Technical Memorandum No. 7, RI Phase IIB Workplan (ABB-ES, 1995e) and in the NAS Whiting Field GIR (HLA, 1998).

These field and laboratory investigation techniques are in general conformance with USEPA standard operating procedure (USEPA, 1991a and 1996a) and were followed during the RI sampling and analysis program.

The following sections provide a brief description of the field investigation and types of environmental samples collected and analyzed for an assessment of the surface soil, subsurface soil, groundwater, and hydrogeology at Sites 9 and 10.

3.1 GEOPHYSICAL SURVEY. Geophysical surveys at Sites 9 and 10 were conducted between May 26 and June 14, 1992. The purpose of the geophysical surveys was to assess the lateral extent of the waste disposal area and locate buried metallic or nonmetallic objects that may indicate a potential waste disposal area. The geophysical methods were also used to locate possible underground utility lines, fuel distribution lines, and other anthropogenic obstructions that need to be avoided with other intrusive subsurface exploration activities (i.e., test pitting).

Geophysical methods used at the site include electromagnetic (EM) induction and magnetometry (MAG). Blackhawk Geosciences, Inc., of Golden, Colorado, was subcontracted by HLA (then ABB-ES) to conduct the geophysical tasks. A technical report describing the methodology, results, and conclusions of the geophysical survey was prepared in February 1993 (ABB-ES, 1993). The following paragraph presents a brief description of the geophysical field program.

Data from the EM and MAG surveys were collected along east-to-west grid lines that were spaced 40 feet apart. The grid lines were oriented with a magnetic compass and measuring tape. Data were collected at stations located at 10-foot intervals along each grid line. These grid lines were later surveyed by a Florida-licensed surveyor. The location of the grid and the plotted geophysical data are presented on Figures A-1 through A-4 in Appendix A (Geophysical Data). The results of the geophysical survey are presented in Section 5.1.

3.2 SOIL GAS SURVEY FOR METHANE. A soil gas survey was conducted in June 1995 at Sites 9 and 10 to assess the presence of methane gas or other VOCs potentially emanating from the site. Soil gas samples were collected across the site and up to 400 feet beyond the site boundary. Sample locations were determined based on a 100- by 100-foot grid spacing based on random origination points. The grid origin was located at an area that was assumed not to be influenced by soil gas emanating from the site. All grid lines were oriented in north-south and east-west directions. The grid area at Sites 9 and 10 included the areal extent of the disposal areas based on previous geophysical survey interpretation. Common grid origination points were selected for both Sites 9 and 10 because these sites are adjacent to each other and lack a physical boundary between them. Figure 3-1 presents the locations of the active soil gas survey points.

At each location, an open-ended stainless-steel tube was pushed or manually driven to the proposed sampling depths of 1.5 feet and 3.0 feet bls. Organic vapor measurements were made at the two sampling depths. The air within the stainless-steel tube was purged with a vacuum pump to obtain a representative sample of soil gas. Total organic vapor concentrations (TOVCs) were measured using a Portafid II™ or a Foxboro OVA-128™ organic vapor analyzer (OVA). Using a granulated carbon filter, methane gas concentrations were also recorded. A comparison of the two measurements allowed a quantitative analysis of the net presence of VOCs. Soil gas samples were not submitted for laboratory analysis.

A common problem associated with the use of the OVAs was probe flameout due to either high humidity or high carbon dioxide (CO_2)/low oxygen (O_2) levels in the soil-gas samples. If an OVA flameout occurred, a landfill gas analyzer (LFG-10™) was used to measure methane and CO_2 levels. The results of the soil gas survey are presented in Section 5.2.

3.3 GEOLOGIC ASSESSMENT. Several subsurface exploration techniques were used during Phase I and II investigations to evaluate and characterize the stratigraphy at Site 9 and 10 and investigate for the potential presence of a continuous confining clay layer at the site. Exploration techniques included monitoring well installation, PCPT soundings, and test pitting.

Detailed lithologic descriptions for monitoring wells and PCPT soundings are presented in Phase I Technical Memorandum No. 1, Geologic Assessment (ABB-ES, 1992a) and in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a). A summary of the geological assessment results is presented in Section 5.3, and the monitoring well boring logs for Sites 9 and 10 are presented in Appendix E of this report.

3.4 HYDROGEOLOGIC ASSESSMENT. The hydrogeologic assessment at NAS Whiting Field included activities to characterize groundwater flow direction and estimate aquifer characteristics such as hydraulic conductivity, horizontal gradients, and seepage velocities at specific sites. The field investigation activities at Sites 9 and 10 included the collection of water-level data from two Phase IIB monitoring wells, seven Phase IIA monitoring wells, two Phase I wells, and six wells constructed during the Verification Study (Geraghty & Miller, 1986). In addition, slug tests were conducted on five monitoring wells in the vicinity of Sites 9 and 10. Results of the Phase IIA hydrological assessment are presented in Phase IIA

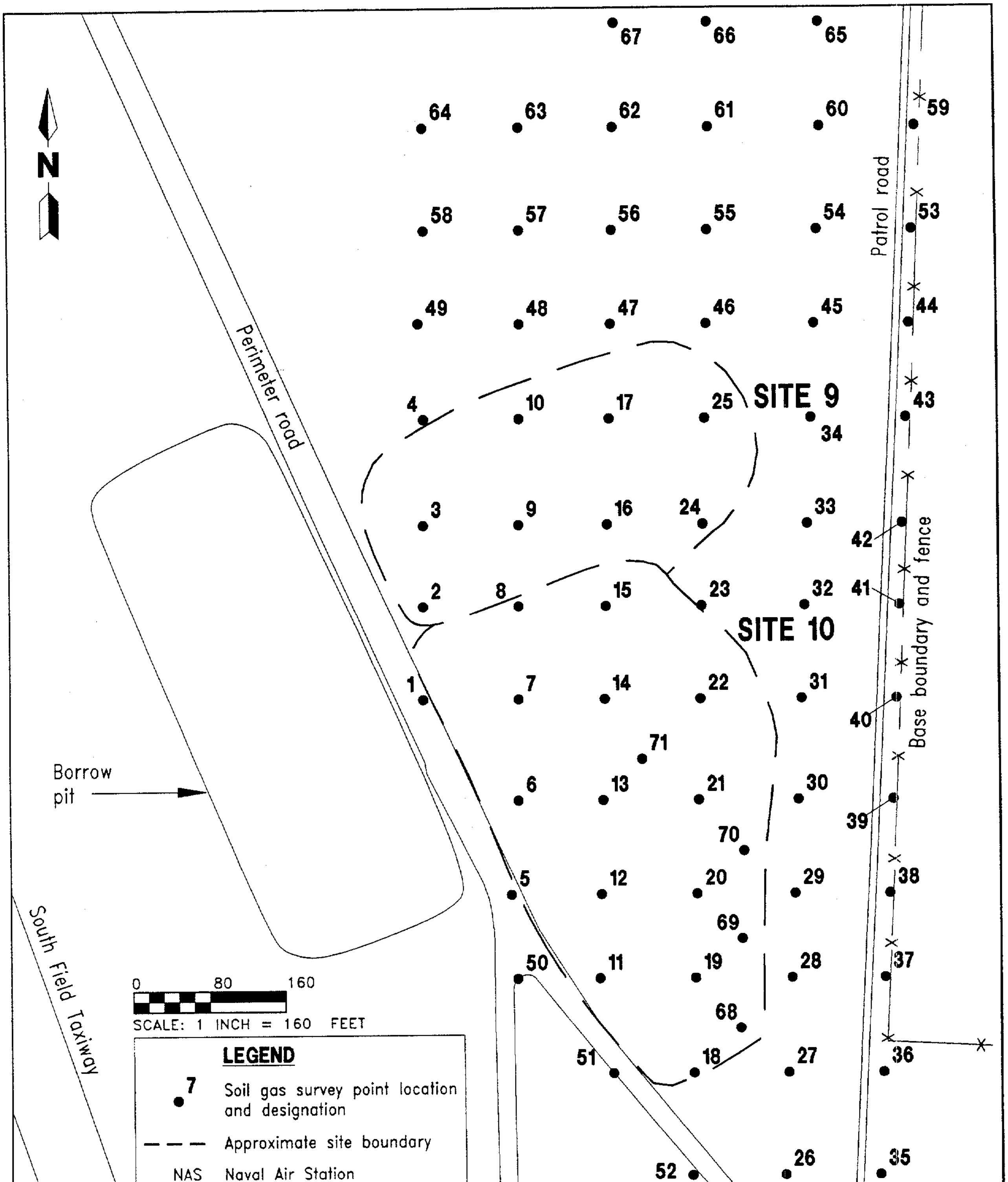

FIGURE 3-1
LOCATION OF ACTIVE SOIL GAS SURVEY POINTS

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Technical Memorandum No. 4, Hydrogeologic Assessment (ABB-ES, 1995c). Monitoring well construction details are presented in Table 3-1. Results of the hydrogeologic assessment are presented in Section 5.4 of this report.

3.5 SURFACE SOIL ASSESSMENT. Characterization of surface soil (land surface to 1.0 foot bls) was required to support the ERA and HHRA (exposure of transient persons to site soil). Soil samples from previous studies were biased based on visual and geophysical anomalies. As a result, soil samples from random locations were warranted to confirm the presence or absence of contamination, and characterize the nature and extent of contamination.

Surface soil samples were compared to Florida Soil Target Cleanup Levels (FSTCLs), USEPA Region III Risk-Based Concentrations (RBCs), and background surface soil data for NAS Whiting Field, which is presented in Subsection 3.3.1 of the GIR (HLA, 1998).

For Site 9, the surface soil assessment included the collection of five surface soil samples during Phase IIB. For Site 10, the surface soil assessment included the collection of 5 surface soil samples during Phase IIA and 6 surface soil samples during Phase IIB of the RI. The locations of the surface soil samples during Phase IIA and IIB are shown on Figure 3-2. Results of the surface soil assessment are presented in Section 5.5 of this report.

The surface soil samples were collected from the land surface to a maximum depth of 12 inches bls using a decontaminated stainless-steel auger. Soil samples were described using the Unified Soil Classification System and recorded in a bound field logbook by HLA personnel.

The surface soil samples at Sites 9 and 10 were analyzed for Contract Laboratory Program (CLP) (Naval Energy and Environmental Support Activity [NEESA] Level D) TCL VOCs, SVOCs, pesticides and PCBs, TAL inorganics, and TRPH.

Background screening criteria were established by collecting background samples across the installation from each USDA soil type identified at NAS Whiting Field. These data are presented in Subsection 3.3.1 of the GIR (HLA, 1998). The arithmetic mean of analytes detected in the background soil samples was calculated by adding individual analyte concentrations and then dividing the sum by the number of samples from which the analytes were detected. Surface soil sample analytical results were compared to twice the arithmetic mean of analyte concentrations detected in background surface soil samples associated with the Troup loamy sand soil type. A statistical summary for the combined surface soil type background data and the surface soil sampling results are discussed in Section 5.5 of this report. Soil sample analytical data are presented in Appendix F of this report.

3.6 SUBSURFACE SOIL ASSESSMENT. The RI subsurface investigation at Sites 9 and 10 included a PCPT investigation, split-spoon sampling conducted during monitoring well installations, test pit excavation, and subsurface soil sampling.

Subsurface soil samples were compared to Florida soil cleanup target levels (SCTLs), RBCs, and background subsurface soil data for NAS Whiting Field, which are presented in Subsection 3.3.1 of the GIR (HLA, 1998).

Table 3-1
Summary of Monitoring Well Construction Details

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	RI Phase of Well Completion	Well Size (inches)	Land Surface Elevation (feet msl)	TOC Elevation (feet msl)	Total Well Depth (feet BTOC)	Approximate Screen Interval (feet BTOC)	Surface Casing Length (feet bls)
Southeast Disposal Area							
Site 9, Waste Fuel Disposal Pit							
WHF-9-1	VS	4	144.66	146.55	118.40	108 to 118	NA
WHF-9-2	I	4	158.11	161.07	124.35	114 to 124	NA
WHF-9-3S	IIA	2	147.92	150.85	108.24	93 to 108	0 to 77
Site 10, Southeast Open Disposal Area (A)							
WHF-10-1	VS	4	144.19	146.73	118.20	108 to 118	NA
WHF-10-2	IIA	2	147.78	150.75	113.14	98 to 113	NA
Site 11, Southeast Open Disposal Area (B)							
WHF-11-1	VS	4	122.48	124.86	128.40	118 to 128	NA
WHF-11-1S	IIA	2	114.91	116.65	54.40	39 to 54	NA
WHF-11-2	I	4	145.19	148.12	125.84	120 to 125	NA
WHF-11-3	IIA	2	114.29	117.19	73.16	58 to 73	0 to 46
WHF-11-4S	IIB	2	126.13	129.43	79.0	64 to 79	NA
WHF-11-4D	IIB	2	125.79	128.94	109.0	99 to 109	NA
Site 12, Tetraethyl Lead Disposal Area							
WHF-12-1	VS	4	134.20	136.40	113.40	103 to 113	NA
Site 13, Sanitary Landfill							
WHF-13-1	VS	4	100.40	102.66	122.90	112 to 122	NA
WHF-13-1S	IIA	2	104.61	108.97	61.30	46 to 61	NA
WHF-13-1I	IIB	2	106.09	109.17	91.0	80 to 90	NA
WHF-13-2S	IIA	2	99.94	102.86	72.41	57 to 72	0 to 42
WHF-13-3S	IIB	2	81.38	81.44	42.0	26 to 41	NA
WHF-13-4S	IIB	2	80.41	80.37	41.0	25 to 40	NA
Site 14, Short-Term Sanitary Landfill							
WHF-14-1	VS	4	137.83	139.69	153.20	143 to 153	NA
WHF-14-2	IIA	2	142.86	145.80	118.30	103 to 118	0 to 94

Notes: RI = remedial investigation.
msl = mean sea level.
TOC = top of casing.
BTOC = below top of casing.
bls = below land surface.
VS = Verification Study.
NA = not applicable.
I = Remedial Investigation Phase I.
IIA = Remedial Investigation Phase IIA.
IIB = Remedial Investigation Phase IIB.

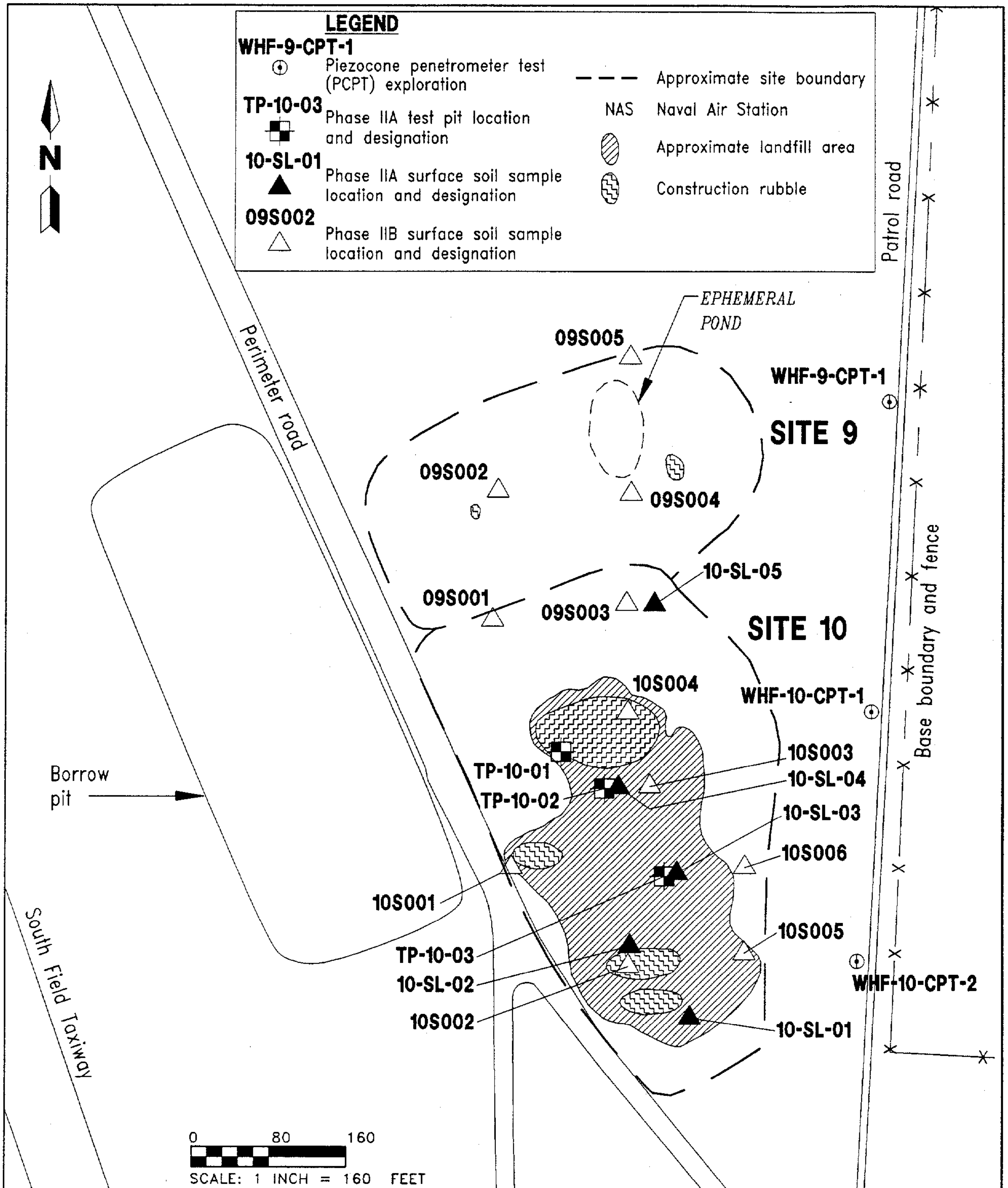

FIGURE 3-2
LOCATION OF SURFACE SOIL SAMPLES, TEST PITS, AND PCPT EXPLORATIONS FOR PHASE IIA AND IIB

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The locations of the subsurface soil samples collected from the test pits at Site 10 are shown on Figure 3-2. Results of the subsurface soil assessment are presented in Section 5.6 of this report.

3.6.1 Piezocone Penetrometer Investigation One PCPT exploration was performed at Site 9 (WHF-9-CPT-1) to a total depth of 100 feet bls during Phase I of the RI (1991). Two PCPT explorations were also performed at Site 10 (WHF-10-CPT-1 and WHF-10-CPT-2) during Phase I of the RI (1991). The location of the PCPT exploration is shown on Figure 3-2.

The PCPT exploration consisted of a stainless-steel cone tip (equipped with electronic sensors) connected to stainless-steel rods that were hydraulically driven into the overburden soils. Measurements of end-bearing resistance, friction resistance, and pore pressure were recorded from the sensors throughout the sounding. The analog signals from the cone tip sensors were digitized for data logging, and analyses of the digital data were completed in the field using a data acquisition software system. Based on the cone readings, a lithologic description of the soil was computed with the aid of the software package.

The cone tip was advanced until the friction resistance of the overburden soils exceeded the power of the hydraulic system (i.e., refusal). At that point, the exploration was then terminated. The primary purpose of extending the PCPT probe was to collect *in situ* groundwater samples using the BAT screening technique. The BAT *in situ* groundwater sampling technique is described in Phase IIA Technical Memorandum No. 5, Groundwater Assessment (ABB-ES, 1995d). A summary of the sounding designations, completion dates, proposed and actual depths, and the lithologic descriptions for the soundings are presented in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a).

3.6.2 Split-Spoon Sampling Lithologic data were also obtained by collecting subsurface soil samples at monitoring well locations (see Figure 3-3). A 2-foot split-spoon sample was collected for visual inspection by an HLA geologist, and all pertinent data were entered into a bound logbook. Detailed soil descriptions and other pertinent data are presented in the boring logs for the soil boring investigation, located in Phase IIA Technical Memorandum No. 2, Geologic Assessment (ABB-ES, 1995a) and in Section 5.3 of this report. Split-spoon samples were generally collected at 5-foot intervals during drilling of the monitoring wells. Monitoring well installations were conducted in conjunction with the hydrogeologic and groundwater investigations, which are summarized in Phase IIA Technical Memoranda 4 and 5, respectively (ABB-ES, 1995c and 1995d).

3.6.3 Test Pitting Five test pits were excavated at Site 10 in October 1992, following the completion of the geophysical survey. Test pits were not excavated at Site 9 because the results of the geophysical survey did not support the potential for buried wastes. UXB International, Inc. (UXB) of Chantilly, Virginia, was subcontracted by HLA to conduct the test pit excavations.

The five test pits were excavated at those locations where geophysical anomalies potentially defined buried materials. The purpose of the test pits was to characterize waste materials (if present) by providing a description of the waste and collection and chemical analysis of a subsurface soil sample. The analytical data were used to characterize the nature of soil contamination within the test pits.

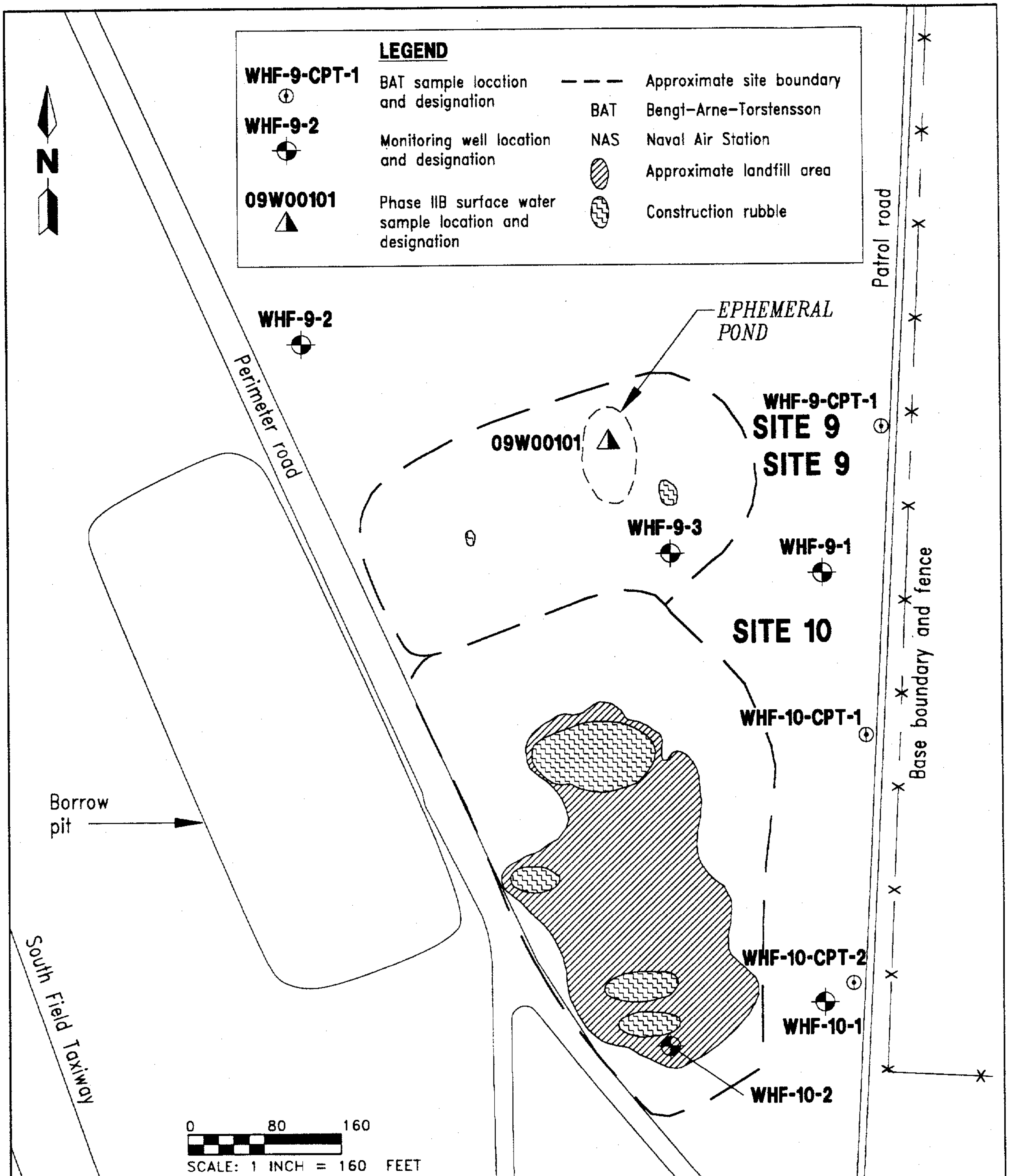

FIGURE 3-3
LOCATION OF MONITORING WELLS, BAT SAMPLES, AND SURFACE WATER SAMPLES

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Prior to excavating the test pits at Site 10, the proposed areal dimensions and orientation of the test pits were surveyed by UXB with a hand-held magnetometer, a terrain conductivity meter (FEREX™ 4.021), and a metal detector. Site-specific field activities also included clearing of vegetation when necessary.

After the test pit location and orientation had been determined, the four corners of the test pit were staked. The staked locations were referenced to the grid coordinates defined for the geophysical survey. A backhoe was used to excavate a rectangular pit. The physical description of each soil layer and waste type was recorded in the field logbook during test pit excavation. A subsurface soil sample was collected directly from the backhoe bucket during the excavation. The depth of the subsurface soil samples ranged from 4 feet bls to 9.5 feet bls at Site 10 test pits. Following sample collection, the test pit was backfilled with excavated soil using the backhoe.

Three subsurface soil samples were collected from three different test pits at Site 10. Sample 10-SS-02-01 was collected from TP-10-02 from 4 to 5 feet bls. Sample 10-SS-03-02 and duplicate sample 10-SS-03-02A was collected from TP-10-03 from 6 to 8 feet bls. Sample 10-SS-05-03 was collected from TP-10-05 from 8 to 9.5 feet bls. The locations of the test pits are presented on Figure 3-2. Each soil sample was analyzed for TCL VOCs, SVOCs, pesticides, PCBs, TAL metals, and cyanide. The sampling results are discussed in Section 5.6 of this report.

<u>3.7 GROUNDWATER ASSESSMENT</u>. Groundwater assessment activities included collecting groundwater samples with a BAT sampler during Phase I and collecting groundwater samples from monitoring wells installed in Phase IIA and IIB. Groundwater sampling was conducted at Sites 9 and 10 to assess the lateral and vertical extent of potential groundwater contamination. The locations of the monitoring wells and BAT samples are shown on Figure 3-3.

The Phase I investigation includes the collection of a PCPT/BAT sample from one location (WHF-9-CPT-1) at Site 9 and two locations (WHF-10-CPT-1 and WHF-10-CPT-2) at Site 10. At PCPT/BAT location WHF-10-CPT-2, two groundwater samples were collected from different depths (102 feet bls and 152 feet bls). The BAT groundwater samples were analyzed for TCL VOCs and TAL metals at an off-site laboratory. A summary of the analytical results are presented in Section 5.7 of this report.

The Phase IIA investigation included the installation of one monitoring well (WHF-9-3) at Site 9. The newly installed monitoring well and two existing monitoring wells at the site were sampled and analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganic analytes. At Site 10, a second monitoring well (WHF-10-2) was installed in 1993, and groundwater samples were collected from both monitoring wells WHF-10-1 and WHF-10-2. Samples were analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganic analytes.

The Phase IIA groundwater samples were collected from the monitoring wells using a Teflon™ bailer after purging the monitoring wells with a submersible or blader pump. Purging and sampling methodology was followed as presented in Paragraph 2.1.7.2 of the GIR (HLA, 1998). The groundwater samples were analyzed for CLP (NEESA Level C) TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganics.

A summary of the analytes detected in groundwater is discussed in Section 5.7, and the groundwater analytical data are presented in Appendix G of this report.

During Phase IIB of the RI, the three existing monitoring wells at Site 9, and two existing wells at Site 10 were sampled using low-flow sampling techniques. Purging and sampling methodology was followed as presented in Paragraph 2.1.7.2 of the GIR (HLA, 1998). The groundwater samples were analyzed for CLP (NEESA Level D) TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganics. Samples for TAL inorganics were unfiltered (total analysis) if turbidity was below 10 nephelometric turbidity units (NTUs). If turbidity was greater than 10 NTU, an additional groundwater sample was collected and filtered (dissolved-phase inorganics) using a 45-micron filter. The purpose of the additional groundwater sample was to assess uncertainty associated with a turbid unfiltered groundwater sample.

Analyses were also conducted to assess secondary water quality parameters and provide data for assessing remedial alternatives in the FS. The analyses included alkalinity, chloride, sulfates, color, hardness, ammonia nitrates, total Kjeldahl nitrogen, nitrate and nitrite, pH, phosphorous, total dissolved solids (TDS), total organic carbon, and sulfides. Water quality parameter data are presented in Section 5.7 of this report.

<u>3.8 SURFACE WATER ASSESSMENT</u>. Surface water assessment activities included collecting a surface water sample during Phase IIB from the ephemeral pond at Site 9. The ephemeral pond occurs during heavy rain periods and is shown on Figure 3-3. Surface water is not present at Site 10; therefore, no surface water assessment was conducted. The surface water sampling at Site 9 was conducted to assess the extent of surface water contamination from storm water runoff or contaminated surface soil (if present). A summary of the analytes detected in surface water is discussed in Section 5.7 of this report.

4.0 SITE-SPECIFIC DATA QUALITY ASSESSMENT

This chapter describes how the data generated during Phase IIB of the RI at Sites 9 and 10 were managed and evaluated. Section 4.1 describes the analytical program and data management for the RI at Sites 9 and 10. Section 4.2 summarizes the precision, accuracy, representativeness, comparability, and completeness (PARCC) report on the data. Section 4.3 presents a summary of the Data Quality Assessment.

The soil and groundwater samples collected during Phase IIA of the RI were qualified according to USEPA functional guidelines for evaluation of organic (USEPA, 1991b) and inorganic (USEPA, 1988a) analytical data analyzed using USEPA CLP protocol. The Data Quality Objective (DQO) assessment for the Phase IIA soil samples is presented in detail in RI Phase IIA Technical Memorandum No. 3 (ABB-ES, 1995b). The DQO assessment for the Phase IIA groundwater samples is presented in detail in RI Phase IIA Technical Memorandum No. 5 (ABB-ES, 1995d).

<u>4.1 ANALYTICAL PROGRAM</u>. Environmental and quality control samples collected during Phase IIB of the RI at Sites 9 and 10 were analyzed using field screening methods and laboratory analytical methods. Site 9 and 10 analytical results and quality control data are included with sample delivery groups (SDGs) WF006, WF007, WF11A, WF11B, WF027, and WF028. The field QC data are presented in Appendix B of this report. Sampling locations are presented in Section 3.0 and sample results are presented in Section 5.0 of this report. The analytical data are presented in Appendix F (soil data) and Appendix G (groundwater data).

Environmental samples (surface soil, subsurface soil, surface water, and groundwater) were collected and analyzed at an off-site laboratory using SW-846 methodology (USEPA, 1986a) for analysis of VOCs, SVOCs, pesticides, PCBs, total petroleum hydrocarbons (TPH), metals and cyanide. Some groundwater samples were also analyzed for wet chemistry analyses. The laboratory analytical program is described in more detail in Section 2.2 of the NAS Whiting Field GIR (HLA, 1998).

Analytical results obtained for all environmental samples during the RI sampling events were submitted as NEESA Level D (USEPA Level IV) analytical packages for VOCs, SVOCs, pesticides, PCBs, TPH, metals, cyanide, and wet chemistry.

<u>4.2 DATA REVIEW</u>. Data validation is the technical review of individual analytical results relative to the following criteria:

- DQOs and the QAPP in the NAS Whiting Field Workplan (E.C. Jordan Co., Inc., 1990 and ABB-ES, 1995c).
- NEESA guidance document 20.2-047B, Sampling and Chemical Analysis Quality Assurance Requirements for the Navy Installation Program (NEESA, 1988).
- USEPA, Contract Laboratory Program National Functional Guidelines for Organic Data Review, February 1994 (USEPA, 1994a).
- USEPA, Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994 (USEPA, 1994b).

The data validation process is described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998).

The data were reviewed, validated, and evaluated using the PARCC criteria specified in the DQOs. PARCC criteria are described in Section 2.3 of the NAS Whiting Field GIR (HLA, 1998). The Sites 9 and 10 Phase IIB soil, groundwater, and surface water analytical data were validated by Laboratory Data Consultants, Inc. (LDC), of Carlsbad, California, in 1996-97. The subsections below summarize the PARCC criteria evaluation of the analytical data.

<u>4.2.1 **Precision**</u> Precision is a measure of the agreement or repeatability of a set of replicate results (relative percent difference, [RPD]) obtained from duplicate laboratory analyses of samples collected from the same location and depth interval. Precision for analytical data collected during the RI sampling events was evaluated using results of field duplicate samples, laboratory duplicate samples, matrix spike and matrix spike duplicate (MS/MSD) samples, and/or consecutive laboratory control samples. The evaluation of precision for the field duplicate samples at Sites 9 and 10 is presented in Table 4-1 and summarized below.

<u>**Site 9**</u>. Field duplicate samples were collected during Phase IIB surface soil, surface water, and groundwater sampling at Site 9. Precision calculations (i.e., RPD) were performed on analytes that were detected in both the sample and duplicate sample.

<u>Organic Analytes</u>. The RPD criteria for one VOC (acetone) in one groundwater sample (09G00301) did not meet the 30 percent control limit as shown in Table 4-1. All other organic analytes were within the control limit for RPD. Since acetone is widely recognized as a laboratory contaminant, the acetone spike in the sample and duplicate may not have been introduced in the field. Furthermore, the high imprecision of acetone (88 percent RPD) may be the result of poor laboratory instrument stability rather than improper sample collection and handling.

<u>Inorganic Analytes</u>. The RPD criteria for six inorganic analytes (barium, beryllium, calcium, lead, manganese, and zinc) in one soil sample (09S00301) did not meet the 50 percent control limit (Table 4-1) due to sample heterogeneity or poor laboratory instrument stability. The RPD criteria for two inorganic analytes (chromium and zinc) in one groundwater sample (09G00301) did not meet the 30 percent control limit (Table 4-1) due to poor instrument stability. According to the data validation (LDC, 1996-97), the exceedences in the inorganic analytes are considered moderately imprecise.

<u>**Site 10**</u>. Field duplicate samples were collected during Phase IIB surface soil sampling at Site 10. Precision calculations (i.e., RPD) were performed on analytes that were detected in both the sample and duplicate sample.

<u>Organic Analytes</u>. The RPD criteria for several SVOCs in two surface soil samples (10S00101 and 10S00201) did not meet the 50 percent control limit as shown in Table 4-1. All other organic analytes were within the control limit for RPD. According to the data validation (LDC, 1996-97), the exceedences in the SVOCs are considered moderately imprecise.

Table 4-1
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Analyte	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
		Soil - Site 9				
WF006						
Organics (µg/kg)	09S00301	Acetone	ND	5	NC	50
TAL Metals (mg/kg)	09S00301	Aluminum	25,200	33,100	27	50
		Arsenic	8.5	7.1	18	50
		Barium	8.9	21.7	83	30
		Beryllium	0.12	0.22	59	50
		Calcium	176	384	74	50
		Chromium	21.7	29.5	30	50
		Cobalt	0.52	0.55	6	50
		Copper	6.8	9.0	28	50
		Iron	17,800	26,500	40	50
		Lead	11.2	6.6	52	50
		Magnesium	143	227	45	50
		Manganese	28.2	52.9	61	50
		Mercury	0.01	0.01	0	50
		Nickel	ND	6.1	NC	50
		Potassium	ND	212	NC	50
		Selenium	0.33	ND	NC	50
		Sodium	8.4	10.4	21	50
		Vanadium	43.5	65.1	40	50
		Zinc	6.3	14.4	78	50
		Cyanide	ND	ND	0	50
		TRPH	ND	ND	0	50
		Surface Water - Site 9				
WF11A						
Organics (µg/ℓ)	09W00101	Toluene	ND	1	NC	30
TAL Metals (µg/ℓ)	09W00101	Aluminum	123	129	5	30
		Arsenic	0.60	ND	NC	30
		Barium	1.1	1.3	17	30
		Beryllium	0.53	ND	NC	30
		Calcium	760	726	5	30

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
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SDG Number	Sample ID	Analyte	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
TAL Metals (µg/ℓ) **(continued)**						
		Iron	118	105	12	30
		Magnesium	234	236	1	30
		Potassium	313	298	2	30
		Sodium	904	893	1	30
		Zinc	5.4	3.8	34	30
		Cyanide	ND	ND	0	30
		TRPH	ND	ND	0	30
		Groundwater - Site 9				
WF027						
Organics (µg/ℓ)	09G00301	Acetone	46	18	88	30
		2-Butanone	2	ND	NC	30
TAL Metals (µg/ℓ)	09G00301	Aluminum	407	372	9	30
		Antimony	ND	9.3	NC	30
		Arsenic	2.6	2.8	7	30
		Barium	27.1	25.8	5	30
		Calcium	15,300	14,600	5	30
		Chromium	4.0	2.4	50	30
		Iron	173	148	16	30
		Lead	ND	0.60	NC	30
		Magnesium	158	160	1	30
		Manganese	1.5	1.7	12	30
		Potassium	2390	2,010	11	30
		Sodium	2,070	1,950	6	30
		Vanadium	16.4	14.3	14	30
		Zinc	14.8	1.2	170	30
		Cyanide	ND	ND	0	30
		Soil - Site 10				
WF007						
Organics (µg/kg)	10S00101	Phenanthrene	280	1,200	124	50
		Fluoranthene	660	2,300	111	50
		Pyrene	580	1,600	94	50
		Benzo(a)anthracene	340	1,200	112	50
		Chrysene	500	1,400	120	50

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
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SDG Number	Sample ID	Analyte	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
Organics (μg/kg) **(continued)**						
		bis(2-Ethylhexyl)phthalate	200	ND	NC	50
		Benzo(b)fluoranthene	480	1,300	92	50
		Benzo(k)fluoranthene	360	900	86	50
		Benzo(a)pyrene	400	1,000	86	50
		Indeno(1,2,3-cd)pyrene	180	360	67	50
		Benzo(g,h,i)perylene	180	340	62	50
		Anthracene	ND	270	NC	50
		Carbazole	ND	100	NC	50
		Dibenzo(a,h)anthracene	ND	270	NC	50
TAL Metals (mg/kg)	10S00101	Aluminum	8,760	8,920	2	50
		Arsenic	2.5	2.6	4	50
		Barium	361	1,320	114	50
		Beryllium	0.13	0.13	0	50
		Cadmium	0.91	ND	NC	50
		Calcium	23,200	17,800	26	50
		Chromium	18.2	16.8	8	50
		Cobalt	0.83	2.0	82	50
		Copper	7.9	7.9	0	50
		Iron	6,520	6,780	4	50
		Lead	38.0	33.1	14	50
		Magnesium	5,910	5,600	5	50
		Manganese	56.6	66.0	15	50
		Mercury	0.07	0.07	0	50
		Nickel	6.8	3.0	77	50
		Potassium	219	ND	NC	50
		Sodium	35.6	46.2	26	50
		Vanadium	18.9	18.7	1	50
		Zinc	37.7	34.1	5	50
		Cyanide	0.10	0.20	67	50
		TRPH	240	180	29	50
WF11B						
Organics (μg/kg)	10S00201	Acetone	29	20	37	50
		2-Hexanone	ND	4	NC	50
		Phenanthrene	68	310	128	50

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Analyte	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
Organics (μg/kg) (continued)						
		Di-*n*-butylphthalate	46	ND	NC	50
		Fluoranthene	160	420	90	50
		Pyrene	170	290	52	50
		Butylbenzylphthalate	57	ND	NC	50
		Benzo(a)anthracene	87	190	74	50
		Chrysene	120	220	59	50
		bis(2-Ethylhexyl)phthalate	3,200	140	183	50
		Benzo(a)fluoranthene	150	200	28	50
		Benzo(k)fluoranthene	110	210	62	50
		Benzo(a)pyrene	95	150	45	50
		Indeno(1,2,3-cd)pyrene	58	56	4	50
		Acenaphthene	ND	40	NC	50
		Anthracene	ND	54	NC	50
		Carbazole	ND	84	NC	50
		4,4'-DDT	7.0	8.9	24	50
		Aroclor-1254	340	390	14	50
TAL Metals (mg/kg)	10S00201	Aluminum	8,960	5,890	41	50
		Arsenic	3.6	2.4	40	50
		Barium	9.2	8.1	13	50
		Beryllium	0.10	0.06	50	50
		Cadmium	1.4	1.3	NC	50
		Calcium	1,320	779	26	50
		Chromium	16.0	12.2	8	50
		Cobalt	0.79	0.82	82	50
		Copper	10.8	11.5	0	50
		Iron	9,660	8,650	4	50
		Lead	32.5	29.0	14	50
		Magnesium	200	100	5	50
		Manganese	39.3	36.4	15	50
		Nickel	2.0	ND	77	50
		Potassium	69.4	ND	NC	50
		Sodium	181	19.2	26	50
		Vanadium	24.5	20.8	1	50
		Zinc	50.0	42.9	5	50

See notes at end of table.

Table 4-1 (Continued)
Precision Summary for Soil and Groundwater Field Duplicate Samples

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SDG Number	Sample ID	Analyte	Sample Concentration (D_1)	Duplicate Concentration (D_2)	RPD (%)	Control Limit (%)
TAL Metals (mg/kg) (continued)						
		Cyanide	0.20	0.13	67	50
		TRPH	105	66.1	29	50

Notes: SDG = sample delivery group.
ID = identifier.
% = percent.
μg/kg = micrograms per kilogram.
TAL = target analyte list.
NC = not calculable.
mg/kg = milligrams per kilogram.
ND = not detected.
TRPH = total recoverable petroleum hydrocarbons.
μg/ℓ = micrograms per liter.
RPD = relative percent difference.

$$RPD = 100 \times \frac{|D_1 - D_2|}{0.5(D_1 + D_2)} \quad (1)$$

Inorganic Analytes. The RPD criteria for five inorganic analytes (barium, beryllium, cobalt, nickel, and cyanide) in two soil samples (10S00101 and 10S00201) did not meet the 50 percent control limit (Table 4-1) due to sample heterogeneity or poor laboratory instrument stability. According to the data validation (LDC, 1996-97), the exceedences in the inorganic analytes are considered moderately imprecise.

4.2.2 **Accuracy** Accuracy is a measure of the agreement between the true value and the value measured using an analytical method (percent recovery). Accuracy also is evaluated during data validation by assessing initial and continuing calibration data for the analytical instrument. Accuracy for analytical data collected during the RI sampling events was assessed by evaluating percentage recoveries for MS/MSD samples, surrogate recoveries, laboratory control samples, and initial and continuing calibration standard results. A summary of accuracy exceedences for MS/MSD samples at Sites 9 and 10 is presented in Table 4-2 and summarized below.

Table 4-2
Accuracy Exceedences for MS/MSD Samples

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
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SDG Number	MS/MSD Sample ID	Analyte	% Recovery MS/MSD	Control Limits (%)
		Surface Water - Site 9		
WF11A				
Organics	09W00101	4-Chloro-3-methylphenol	104/107	23 to 97
		4-Nitrophenol	117/119	10 to 80
		2,4-Dinitrophenol	106/107	24 to 96
		Pentachlorophenol	120/119	96 to 103
		Surface Soil - Site 10		
WF007				
Organics	10S00101	4-Chloro-3-methylphenol	111/--	26 to 103
Inorganics[1]	10S00101	Antimony	65.6	75 to 125
		Barium	171	75 to 125
		Manganese	130	75 to 125
		Lead	128.7	75 to 125
		Selenium	56.1	75 to 125

[1] MSD analyses are generally not performed for inorganic analysis and, therefore, only the % Recovery for the MS is reported.

Notes: SDG = sample delivery group.
MS/MSD = matrix spike and matrix spike duplicate.
ID = identifier.
% = percent.

The percent recovery for some of the MS/MSD samples was above or below the target range; therefore, some analytical results may be biased high or low. Some of the analytical results for SVOCs and inorganic analytes were qualified based on the evaluation of percent recovery. According to the data validation (LDC, 1996-97), the results of organic and inorganic MS/MSD analyses indicate that an acceptable level of accuracy was attained.

A summary of the surrogate spike samples and the surrogate compounds that were outside control limits for the Phase IIB samples collected at Sites 9 and 10 is presented in Table 4-3. The required control limits were also identified for each surrogate compound. All the samples associated with these surrogates were qualified in accordance with the USEPA functional guidelines as presented in Subsection 3.3.4 of the GIR (HLA, 1998).

Table 4-3
Accuracy Summary for Surrogate Recoveries Outside QC Criteria

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SDG Number	Sample ID	Spiked Analyte	Surrogate Recovery (%R)	QC Limits (percent)
WF007	10R00101	Decachlorobiphenyl	54	60 to 150
WF11A	09W00101	Decachlorobiphenyl	50 to 56	60 to 150
	09W00101D	Decachlorobiphenyl	51 to 58	60 to 150
WF11B	10S00201	Decachlorobiphenyl	55 to 56	60 to 150
	10S00301	Decachlorobiphenyl	42 to 45	60 to 150
WF028	10G00101	Decachlorobiphenyl	48 to 50	60 to 150

Notes: SDG = sample delivery group.
ID = identifier.
%R = percent recovery.
QC = quality control.

Initial calibrations were performed to ensure that the instrument was capable of producing acceptable qualitative and quantitative data for compounds on the volatile TCL. Initial calibration demonstrates that the instrument is capable of acceptable performance in the beginning of the analytical run and of producing a linear calibration curve. Continuing calibrations were performed to ensure that the instrument was capable of reproducing acceptable qualitative and quantitative data.

Continuing calibration establishes the 12-hour Relative Response Factor (RRF) on which the quantitations are based and checks satisfactory performance of the instrument on a day-to-day basis. Initial and continuing calibrations for organic analytes are measured by the percent Relative Standard Deviation (%RSD) for initial calibrations and the percent Difference (%D) for continuing calibrations. Table 4-4 summarizes the organic compounds that exceeded the initial or continuing calibrations for surface soil and groundwater samples collected at Sites 9 and 10.

The evaluations of the %RSD for the initial calibrations and the %D for the continuing calibrations indicate that the response factors for the system performance check compounds generally met the required criteria for VOCs, SVOCs,

Table 4-4
Summary of Compounds Exceeding Instrument Calibration for Site 9 and 10 SDGs

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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
WF006	2,4-Dinitrophenol	--	33.1	UJ
	2,4-Dinitrophenol	--	27.0	UJ
	Diethylphthalate	--	27.1 to 30.1	UJ
	Alpha-BHC	21.7	--	UJ
	Alpha-BHC	20.3	--	UJ
WF007	Dimethylphthalate	--	27.1	UJ
	Nitrobenzene	--	25.6 to 30.8	UJ
	Pentachlorophenol	--	29.6 to 29.8	UJ
	2,4-Dinitrophenol	--	41.8	UJ
	4,6-Dinitro-2-methylphenol	--	30.1	UJ
	Benzo(k)fluoranthene	--	26.5	UJ
WF11A	Endosulfan I	22	--	UJ
WF11B	Acetone	--	40.0	UJ
	2-Butanone	--	37.3	UJ
	4-Methyl-2-pentanone	--	37.7	UJ
	2-Hexanone	--	41.0 to 50.9	UJ
	Trichloroethene	--	27.7	UJ
	1,1,2,2-Tetrachloroethane	--	34.2	UJ
	Endosulfan I	22	--	UJ
WF022	4-Chloroaniline	--	31.6	J
	2,4-Dinitrophenol	--	27.6	J
	4,6-Dinitro-2-methylphenol	--	33.8	J
WF027	Acetone	33.8	34.7 to 102.4	J
	2-Butanone	39.1	27.8 to 37.8	J
	Bromomethane	--	31.0	J
	Carbon disulfide	--	28.0	J
	Chloroethane	--	28.4 to 63.9	J
	Chloromethane	--	27.4 to 32.4	J
	2-Hexanone	--	38.9	J
	4-Methyl-2-pentanone	--	32.9 to 35.7	J

See notes at end of table.

Table 4-4 (Continued)
Summary of Compounds Exceeding Instrument Calibration for Sites 9 and 10 SDGs

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
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SDG	Compound	Initial Calibration (%RSD)	Continuing Calibration (%D)	Qualifier
	4-Chloroaniline	--	36.8	J
	3-Nitroaniline	--	37.9	J
	2,4-Dinitrophenol	--	29.3	J
	4-Nitroaniline	--	49.5	J
	4,6-Dintro-2-methylphenol	--	29.4	J
	Pentachlorophenol	--	29.6	J
	3,3-Dichlorobenzidine	--	30.4 to 54.1	J
W028	Acetone	33.8	34.7 to 49.2	J
	2-Butanone	--	32.6 to 41.8	J
	Bromoform	--	26.2	J
	Chloroethane	--	28.4	J
	Chloromethane	--	27.4 to 35.4	J
	1,2-Dichloropropane	--	27.6	J
	2-Hexanone	--	38.9 to 43.3	J
	4-Methyl-2-pentanone	--	40.5	J
	1,1,2,2-Tetrachloroethane	--	26.5	J
	3,3'-Dichlorobenzidine	--	30.4	J
	Benzo(k)fluoranthene	--	28.5	J

Notes: SDG = sample delivery group.
%RSD = percent relative standard deviation for initial calibrations.
%D = percent difference for continuing calibrations.
-- = analyte not detected.
UJ = The analyte was not detected above the reported sample instrument detection limit (IDL); however, the reported concentration is approximate and may not reliably be presumed to be less than the IDL value.
BHC = benzene hexachloride.
J = The analyte was positively identified and is reported as an approximate concentration.

pesticides, and PCBs. Samples associated with those SDGs in which certain VOCs, SVOCs, pesticides, and PCBs exhibiting an RRF that does not meet the minimum requirements were qualified as J/UJ.

4.2.3 Representativeness Representativeness is the degree to which the data obtained from an environmental sample accurately reflect the presence or absence of contamination at a site. Field quality control samples (including source water blanks, equipment rinse blanks, and trip blanks) and laboratory quality control samples (including method blanks [organic analyses] and preparation blanks [inorganic analysis]) were used to assess representativeness. Representativeness also is assessed by review of the adherence to extraction and analysis holding times. The evaluation of representativeness in field quality control samples for Sites 9 and 10 SDGs is presented in Table 4-5 and summarized below.

Trip Blanks. Acetone and methylene chloride were detected in trip blanks with a concentration ranging from 6 to 9 micrograms per liter ($\mu g/\ell$) for acetone and 2 to 5 $\mu g/\ell$ for methylene chloride. Both VOCs are widely recognized as laboratory contaminants commonly introduced during the calibration or cleaning of equipment.

Environmental samples associated with the trip blanks with results greater than the instrument detection limit (IDL) but less than 10 times the amount detected in the trip blank were appropriately annotated with a J or UJ qualifier (LDC, 1996).

Rinsate Blanks. VOCs, if present, were not detected at concentrations exceeding their detection limits in the rinsate blanks. Two SVOCs (di-*n*-butylphthalate and bis(2-ethylhexyl)phthalate) were detected in four rinsate blank samples (Table 4-5). SVOCs, if present, were not detected in associated soil samples at concentrations exceeding their detection limits.

Inorganics detected at concentrations exceeding the IDL but less than the contract-required detection limits (CRDLs) are barium, calcium, lead, and zinc. Cyanide and TRPH were not detected in any of the rinsate blanks.

Field Blank. Two VOCs (acetone and 2-butanone) and one SVOC (di-*n*-butylphthalate) were detected in the field blank at concentrations of 12, 2, and 15 $\mu g/\ell$, respectively. Environmental samples associated with the field blank that reported results greater than the IDL but less than 10 times the amount detected in the field blank were appropriately annotated with a UJ qualifier.

Laboratory Method and Preparation Blanks. Concentrations of VOCs, SVOCs, and metals were detected in the laboratory method blanks associated with SDGs WF006, WF007, WF11A, WF11B, WF027, and WF028.

Environmental samples associated with method blanks that contained methylene chloride and acetone with results greater than IDL but less than 10 times the amount detected in the laboratory preparation blanks were annotated with UJ qualifier (LDC, 1996). For metals, sample results greater than IDL but less than five times the amount detected in the laboratory preparation blanks were appropriately annotated with a J or UJ qualifier (LDC, 1996).

Table 4-5
Representativeness Summary for Field QC Samples for Sites 9 and 10 SDGs

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SDG:	WF006				WF007		WF11B		WF027		WF028
Sample ID:	01F00101	01R00101	01T00101	02T00101	10T00101	10R00101	12T00101	12R00101	16T01901	16R01501	10T02101
Collect Date:	12-06-95	12-06-95	12-05-95	12-6-95	12-7-95	12-7-95	1-5-96	1-5-96	8-19-96	8-21-96	8-26-96
Sample Type:	Field Blank	Rinsate Blank	Trip Blank	Trip Blank	Trip Blank	Rinsate Blank	Trip Blank	Rinsate Blank	Trip Blank	Rinsate Blank	Trip Blank
Volatile Organic Compounds ($\mu g/\ell$)											
Acetone	12	11	9	7	8	--	--	--	6	--	--
2-Butanone	2	--	--	--	--	--	--	--	--	--	--
Methylene chloride	--	--	--	--	--	--	--	--	5	--	2
Semivolatile Organic Compounds ($\mu g/\ell$)											
Di-*n*-butylphthalate	15	8	NA	NA	NA	15	NA	4	NA	5	NA
bis(2-Ethylhexyl)-phthalate	--	2	NA	NA	NA	--	NA	--	NA	--	NA
Pesticides and PCBs ($\mu g/\ell$)											
None detected											
Inorganic Compounds ($\mu g/\ell$)											
Barium	--	--	NA	NA	NA	0.70 J	NA	0.30 J	NA	--	NA
Calcium	--	178 J	NA	NA	NA	--	NA	42.3 J	NA	--	NA
Lead	--	--	NA	NA	NA	--	NA	--	NA	0.80	NA
Zinc	--	2.9 J	NA	NA	NA	17.6 J	NA	--	NA	1.8	NA
TRPH	--	--	NA	NA	NA	--	NA	--	NA	--	NA
Cyanide	--	--	NA	NA	NA	--	NA	--	NA	--	NA

Notes: QC = quality control.
SDG = sample delivery group.
ID = identifier.
$\mu g/\ell$ = micrograms per kilogram.
-- = analyte not detected.
NA = not analyzed.
PCB = polychlorinated biphenyl.
J = estimated value.
TRPH = total recoverable petroleum hydrocarbons.

Sampling and analysis holding times for each analytical fraction were met in all samples. Qualification of the environmental samples were required because of the detection of target analytes in laboratory and field blanks. Qualification of the RI data, based on blank contamination, was performed according to USEPA data validation guidelines (USEPA, 1988a and USEPA, 1991b). According to the data validation (LDC, 1996-97), the analytes detected in the QA/QC blanks are considered common contaminants and were found at typical concentrations; therefore, the analytical results are considered to be representative.

4.2.4 **Comparability** Comparability is the confidence with which one data set can be compared with another and the degree to which the environmental data from each sampling event are considered equivalent. Comparability of the analytical data was assured by using standard operating procedures for sample collection, by using standard chemical analytical methods, and by reporting the analytical results in standard units. The sampling, shipment, and analytical protocols were consistent with USEPA standard operation procedures and methodologies described in workplans for NAS Whiting Field throughout the period of the RI.

4.2.5 **Completeness** Completeness is the percentage of useable data reported and validated compared with the total number of measurements made. Useable data are those measurements that were not rejected (qualified with an "R") during the validation process. None of the analytical data were rejected. The goal for analytical completeness for the RI sampling event was 85 percent useable data. The completeness goal of 85 percent was met for all matrices and all parameters.

4.3 **SUMMARY**. Based on the results of the QC sample analyses, the established precision, accuracy, and representativeness goals of the project were achieved (Table 4-6). Some field and/or laboratory-derived contamination was present in some of the QC samples, which required the results of some environmental samples to be amended. QC sample results and data validation criteria indicate that a 100 percent completeness goal was achieved, thus satisfying the 85 percent goal. Standard methods of analyses and units of measure were used throughout the project; therefore, the QC criteria and the DQOs presented in the workplan were achieved.

Overall, the data generated during the sampling events meet established DQOs and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures.

Table 4-6
Summary of DQO Assessment - PARCC Parameters

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Type	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
Surface Soil Samples - Sites 9 and 10					
SDG WF006, WF007, and WF11B					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL metals and total cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable
TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
Surface Water Samples - Site 9					
SDG WF11A					
TCL VOC	Acceptable	Acceptable	Acceptable	100	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL metals and total cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable
TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
Groundwater Samples - Site 9					
SDG WF027					
TCL VOC	Acceptable	Acceptable	Acceptable	99.0	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL metals and total cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable
Groundwater Samples - Site 10					
SDG WF028					
TCL VOC	Acceptable	Acceptable	Acceptable	99.0	Acceptable
TCL SVOCs	Acceptable	Acceptable	Acceptable	100	Acceptable
Pesticides and PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
TAL metals and total cyanides	Acceptable	Acceptable	Acceptable	100	Acceptable

[1] Cumulative of sampling and analytical components.
[2] Analytical component.

Notes: All the units are expressed as the ratio of number of analytes meeting the quality control criteria to the total number of analytes.

DQO = data quality objective.
PARCC = precision, accuracy, reproducibility, completeness, and comparability.
% = percent.
SDG = sample delivery group.
TCL VOC = target compound list volatile organic compound.
TCL SVOC = target compound list semivolatile organic compound.
PCB = polychlorinated biphenyl.
TAL = target analyte list.
TRPH = total recoverable petroleum hydrocarbons.

5.0 INVESTIGATIVE RESULTS

The following sections present the results of the geophysical survey, soil gas survey, geological assessment, and hydrogeological assessment. In addition, the analytical results for surface soil, subsurface soil, and groundwater sampling events are presented.

5.1 GEOPHYSICAL SURVEY. The geophysical survey suggested the presence of three geophysical anomalies indicating buried wastes at Sites 9 and 10. The survey identified one minor disposal area at Site 9 and one major disposal area at Site 10. The lateral boundaries of the disposal areas at Site 10 were delineated using the geophysical survey results and are provided on Figure 1-3 and Appendix A.

At Site 9, two small, low amplitude anomalies were identified on the northern part of the site near the ponded area (Figure 1-3). At Site 10, one anomaly was interpreted to be a disposal area (approximately 1.8 acres).

During the survey, several piles of construction debris were present at Site 10, and a ponded area was present on the northeastern portion of Site 9. The landfill disposal area shown on Figure A-1, Appendix A, was based on all three geophysical data sets (total magnetic field, EM conductivity, and EM inphase).

The northern and southern edges of the landfill area also correspond to the piles of construction debris on the surface. Additional information on the geophysical survey is available in the RI/FS Phase IIA Technical Memorandum No. 3, Appendix A (ABB-ES, 1993).

5.2 SOIL GAS SURVEY. An active soil gas survey was conducted at 56 of the 71 proposed soil gas locations at Sites 9 and 10 (Figure 3-1). Locations not monitored were either inaccessible or were several grid spacings beyond the boundaries of the geophysically identified disposal areas and beyond areas with no detectable soil gas.

Site 9. Measurable concentrations of TOVCs or methane were not present in any of the soil gas samples collected at the site. This suggests that landfilled materials, if present, are not generating measurable concentrations of organic vapors.

Site 10. TOVCs were detected in soil gas samples from seven locations at Site 10. Table 5-1 presents the results of the soil gas survey at Site 10. TOVC concentrations ranged from 0 ppm to greater than 5,000 parts per million (ppm); however, methane was detected at all locations with measurable TOVC concentrations. Methane concentrations ranged from 0 ppm to greater than 5,000 ppm. The net VOC concentrations ranged from 0 ppm to 1,500 ppm, and the percent methane ranged from 0 to 100 percent as shown in Table 5-1. Duplicate sample results showed both spatial and temporal variability in soil gas concentrations within a 10-foot radius of the grid sample point.

Methane and O_2 presence in certain locations at Site 10 may indicate that both aerobic and anaerobic decomposition of buried organic waste are simultaneously occurring.

Table 5-1
Summary of Detected Concentrations for Active Soil Gas Survey at Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Location[1]	Depth (feet)	Total VOC (ppm)	Methane (ppm)	Net VOC [TOVC - Methane] (ppm)	%Methane (percent)
12	1.5	1,400	700	700	50
	3.0	>5,000	>5,000	0	100
12D	1.5	>5,000	>5,000	0	100
	3.0	150	125	25	83
13	1.5	2,700	2,700	0	100
	3.0	>5,000	>5,000	0	100
13D	1.5	>5,000	>5,000	0	100
	3.0	>5,000	>5,000	0	100
18	1.5	0	0	0	0
	3.0	2,500	1,000	1,500	40
18D	1.5	5	2	3	40
	3.0	>5,000	>5,000	0	100
19	1.5	1,000	1,000	0	100
	3.0	1,000	1,000	0	100
20	1.5	60	60	0	100
	3.0	600	550	50	92
21	1.5	850	0	850	0
	3.0	5	5	0	100
68	1.5	400	400	0	100
	3.0	1,000	500	500	50

[1] See Figure 3-1 for sample locations.

Notes: VOC = volatile organic compound.
ppm = parts per million.
TOVC = total organic vapor concentration.
% = percent.
> = greater than.
D = duplicate sample collected.

Locations with measurable soil gas at Site 10 were all within the larger disposal area except for sample location 18, which is approximately 30 feet south of the edge of the disposal area (Figures 3-1 and 3-2). Evidence of off-site migration of soil gas was not encountered at Site 10.

The methane and O_2 concentrations detected at Site 10 were compared to gas control guidance concentrations stated in FDEP 62-701: Solid Waste Management Facilities. None of the concentrations detected at Site 10 exceeded guidance concentrations that require a landfill gas control system.

<u>5.3 GEOLOGIC ASSESSMENT</u>. Surface soils were generally described as yellow to orange (fine- to very fine-grained) clayey sand or light tan (fine to very fine-grained) silty sand (HLA, 1998). The shallow subsurface soil (2 to 7 feet bls) tended to be brown to red in color with interbedded sand silt and clay layers (ABB-ES, 1995a).

The lithology of subsurface consists predominantly of yellow, red, and brown silt and sand (fine- to medium-grained) overlying well-graded sands. At Site 10, the interbedded sand-silt-clay layer overlays a 15- to 20-foot-thick layer of silty sand. Stringers of clay and poorly graded sands were common throughout the area. Detailed descriptions can be found in the boring and monitoring well logs presented in the RI Phase IIA Technical Memorandum No. 2 (ABB-ES, 1995a). A general discussion of the geology at NAS Whiting Field is presented in Subsection 1.4.5 of the GIR (HLA, 1998). The monitoring well boring logs for Sites 9 and 10 are presented in Appendix E of this report.

<u>5.4 HYDROGEOLOGIC ASSESSMENT</u>. The hydrogeologic assessment included determining horizontal and vertical hydraulic gradients, hydraulic conductivities, and seepage velocities. The hydrogeologic assessment results are used to characterize the transport of chemicals of potential concern (CPCs) from the site by groundwater flow. Contaminant fate and transport for CPCs at Sites 9 and 10 is presented in Section 8.0 of this report.

Groundwater Flow Direction. Table 5-2 summarizes the results of the water-level measurements for the Southeast Disposal Area (Sites 9 and 10 and adjacent Sites 11, 12, 13, and 14) during the RI field program. Two potentiometric surface maps were generated from the water-level measurement events, which indicate a groundwater flow direction to the southeast at Sites 9 and 10. Figure 5-1 illustrates the potentiometric surface for the February 1994 monitoring event, and Figure 5-2 illustrates the potentiometric surface for the November 1996 monitoring event. Both figures suggest that groundwater flow patterns are similar over time.

Three intermediate depth wells (WHF-11-1, WHF-13-1, and WHF-14-1) were completed at depths generally 10 to 30 feet deeper than the shallow zone monitoring wells (Table 3-1). Data from these three wells suggest a groundwater flow pattern to the southeast, similar to the flow pattern for the shallow water table zone. Facilitywide water table elevation data are provided in Appendix D of the GIR (HLA, 1998).

Table 5-2
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	September 30 and October 1, 1993		February 8 and 9, 1994	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	86.72	59.83	89.34	57.21
WHF-9-2	161.07	124.35	100.03	61.04	102.69	58.38
WHF-9-3S	150.85	108.24	90.78	60.07	93.35	57.50
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	88.12	58.61	90.62	56.11
WHF-10-2	150.75	113.14	92.04	58.71	94.58	56.17
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	51.08	73.78	63.42	61.44
WHF-11-1S	116.65	54.40	45.50	71.15	45.99	70.66
WHF-11-2	148.12	125.84	93.50	54.62	95.93	52.19
WHF-11-3	117.19	73.16	61.91	55.28	64.22	52.97
WHF-11-4S	129.43	76.00	--	--	--	--
WHF-11-4D	129.28	106.00	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	80.20	56.20	82.68	53.72
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	50.62	52.04	52.90	49.76
WHF-13-1S	108.97	61.30	55.25	53.72	57.59	51.38
WHF-13-1I	--	--	--	--	--	--
WHF-13-2S	102.86	72.41	51.61	51.25	53.85	49.01
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	88.49	51.20	90.79	48.90
WHF-14-2	145.80	118.30	95.15	50.65	97.45	48.35

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	June 22 to 24, 1994		October 10 to 13, 1994	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	88.19	58.36	82.20	64.35
WHF-9-2	161.07	124.35	101.95	59.12	95.49	65.58
WHF-9-3S	150.85	108.24	92.28	58.57	86.16	64.69
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	89.60	57.13	83.45	63.28
WHF-10-2	150.75	113.14	93.62	57.13	113.02	37.73
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	62.23	62.63	56.37	68.49
WHF-11-1S	116.65	54.40	44.63	72.02	43.56	73.09
WHF-11-2	148.12	125.84	94.97	53.15	88.79	59.33
WHF-11-3	117.19	73.16	63.08	54.11	57.16	60.03
WHF-11-4S	129.43	76.00	--	--	--	--
WHF-11-4D	129.28	106.00	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	81.67	54.73	75.41	60.99
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	51.89	50.77	46.00	56.66
WHF-13-1S	108.97	61.30	56.45	52.52	50.29	58.68
WHF-13-1I	--	--	--	--	--	--
WHF-13-2S	102.86	72.41	52.93	49.93	47.00	55.86
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	90.12	49.57	83.88	55.81
WHF-14-2	145.80	118.30	96.86	48.94	90.56	55.24

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 10 to 13, 1995		April 19 and 20, 1995	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	82.82	63.73	82.73	63.82
WHF-9-2	161.07	124.35	95.99	65.08	96.14	64.93
WHF-9-3S	150.85	108.24	86.73	64.12	86.80	64.05
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	83.97	62.76	84.12	62.61
WHF-10-2	150.75	113.14	88.00	62.75	88.10	62.65
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	57.17	67.69	56.92	67.94
WHF-11-1S	116.65	54.40	44.57	72.08	44.03	72.62
WHF-11-2	148.12	125.84	89.22	58.90	89.56	58.56
WHF-11-3	117.19	73.16	57.97	59.22	57.74	59.45
WHF-11-4S	129.43	76.00	--	--	--	--
WHF-11-4D	129.28	106.00	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	76.06	60.34	76.22	60.18
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	46.73	55.93	46.61	56.05
WHF-13-1S	108.97	61.30	51.18	57.79	51.02	57.95
WHF-13-1I	--	--	--	--	--	--
WHF-13-2S	102.86	72.41	47.66	55.20	47.64	55.22
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	84.30	55.39	84.67	55.02
WHF-14-2	145.80	118.30	90.93	54.87	91.41	54.39

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	July 28 and 29, 1995		October 12 to 14, 1995	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	82.01	64.54	82.27	64.28
WHF-9-2	161.07	124.35	95.15	65.92	95.35	65.72
WHF-9-3S	150.85	108.24	85.90	64.95	86.14	64.71
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	83.22	63.51	83.62	63.11
WHF-10-2	150.75	113.14	87.15	63.60	87.55	63.20
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	56.49	68.37	56.96	67.90
WHF-11-1S	116.65	54.40	44.41	72.24	44.18	72.47
WHF-11-2	148.12	125.84	88.73	59.39	89.45	58.67
WHF-11-3	117.19	73.16	57.31	59.88	57.81	59.38
WHF-11-4S	129.43	76.00	--	--	--	--
WHF-11-4D	129.28	106.00	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	75.38	61.02	75.99	60.41
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	46.19	56.47	46.93	55.73
WHF-13-1S	108.97	61.30	50.62	58.35	51.34	57.63
WHF-13-1I	--	--	--	--	--	--
WHF-13-2S	102.86	72.41	46.09	56.77	47.98	54.88
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	83.90	55.79	84.84	54.85
WHF-14-2	145.80	118.30	90.55	55.25	91.55	54.25

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 19 and 20, 1996		April 25 to 27, 1996	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	76.91	69.64	75.99	70.56
WHF-9-2	161.07	124.35	90.03	71.04	89.13	71.94
WHF-9-3S	150.85	108.24	80.78	70.07	79.96	70.89
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	78.33	68.40	77.49	69.24
WHF-10-2	150.75	113.14	82.25	68.50	81.44	69.31
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	51.85	73.01	50.82	74.04
WHF-11-1S	116.65	54.40	43.26	73.39	43.35	73.30
WHF-11-2	148.12	125.84	84.03	64.09	83.53	64.59
WHF-11-3	117.19	73.16	52.69	64.50	51.68	65.51
WHF-11-4S	129.43	76.00	--	--	--	--
WHF-11-4D	129.28	106.00	--	--	--	--
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	70.61	65.79	69.90	66.50
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	41.87	60.79	41.14	57.48
WHF-13-1S	108.97	61.30	45.92	63.05	45.18	63.79
WHF-13-1I	--	--	--	--	--	--
WHF-13-2S	102.86	72.41	42.91	59.95	42.26	60.60
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	79.60	60.09	79.14	60.55
WHF-14-2	145.80	118.30	86.30	59.50	85.90	59.90

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	July 25 to 27, 1996		November 7 to 9, 1996	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	77.40	69.11	80.95	65.70
WHF-9-2	161.07	124.35	90.27	70.80	93.61	67.46
WHF-9-3S	150.85	108.24	81.30	69.55	84.67	66.18
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	78.82	67.91	82.18	64.55
WHF-10-2	150.75	113.14	82.66	68.09	86.02	64.73
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	52.98	71.88	56.17	68.69
WHF-11-1S	116.65	54.40	44.43	72.22	45.25	71.40
WHF-11-2	148.12	125.84	84.58	63.54	88.01	60.11
WHF-11-3	117.19	73.16	53.78	63.41	57.03	60.16
WHF-11-4S	129.43	76.00	--	--	67.81	61.62
WHF-11-4D	129.28	106.00	64.20	65.08	68.04	61.24
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	71.37	65.03	74.75	61.65
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	42.84	55.55	46.17	52.18
WHF-13-1S	108.97	61.30	47.11	61.86	50.48	58.49
WHF-13-1I	--	--	--	--	51.45	--
WHF-13-2S	102.86	72.41	43.88	58.98	47.13	55.73
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	80.19	59.50	63.65	76.04
WHF-14-2	145.80	118.30	86.83	58.97	90.33	55.47

See notes at end of table.

Table 5-2 (Continued)
Summary of Water-Level Elevations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Well TOC Elevation (msl)	Well Depth (ft BTOC)	January 16 to 18, 1997		August 7 to 9, 1997	
			Water Level (ft BTOC)	Water Level (ft msl)	Water Level (ft BTOC)	Water Level (ft msl)
Southeast Disposal Area						
Site 9, Waste Fuel Disposal Pit						
WHF-9-1	146.55	118.40	83.07	63.48	84.69	61.86
WHF-9-2	161.07	124.35	96.01	65.06	97.88	63.19
WHF-9-3S	150.85	108.24	87.01	63.84	88.69	62.16
Site 10, Southeast Open Disposal Area (A)						
WHF-10-1	146.73	118.20	84.50	62.23	86.16	60.57
WHF-10-2	150.75	113.14	88.38	62.37	90.08	60.67
Site 11, Southeast Open Disposal Area (B)						
WHF-11-1	124.86	128.40	58.24	66.47	59.28	65.43
WHF-11-1S	116.65	54.40	45.71	70.94	44.83	71.82
WHF-11-2	148.12	125.84	90.29	57.83	92.20	55.92
WHF-11-3	117.19	73.16	59.10	58.09	60.13	57.06
WHF-11-4S	129.43	76.00	70.07	59.36	71.19	58.24
WHF-11-4D	129.28	106.00	69.72	59.56	71.16	58.12
Site 12, Tetraethyl Lead Disposal Area						
WHF-12-1	136.40	113.40	77.02	59.38	78.42	57.98
WHF-12-2	135.56	85.00	76.11	59.45	79.54	56.02
Site 13, Sanitary Landfill						
WHF-13-1	102.66	122.90	48.38	54.28	49.41	53.25
WHF-13-1S	108.97	61.30	52.27	56.70	53.55	55.42
WHF-13-1I	109.17	91.00	52.20	56.97	53.63	55.54
WHF-13-2S	102.86	72.41	49.10	53.76	50.14	52.72
WHF-13-3S	81.44	42.00	--	--	28.26	53.18
WHF-13-4S	80.37	42.00	--	--	31.35	49.02
Site 14, Short-Term Sanitary Landfill						
WHF-14-1	139.69	153.20	85.85	53.84	87.11	52.58
WHF-14-2	145.80	118.30	92.55	53.25	93.83	52.17

Notes: TOC = top of casing.
msl = mean sea level.
ft BTOC = feet below top of casing.
ft msl = feet above mean sea level.
-- = no water level was recorded for this round of sampling.

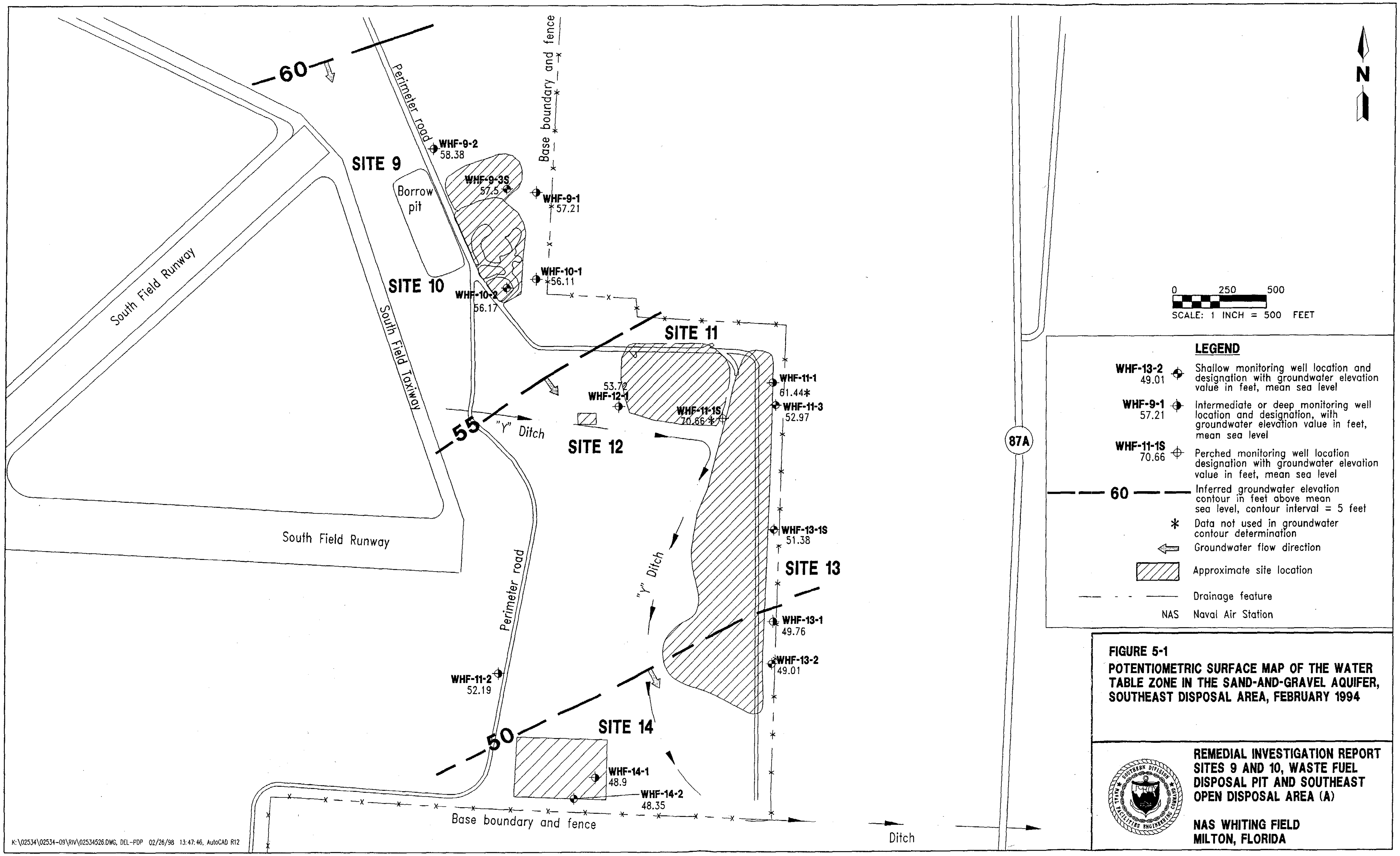

FIGURE 5-1
POTENTIOMETRIC SURFACE MAP OF THE WATER TABLE ZONE IN THE SAND-AND-GRAVEL AQUIFER, SOUTHEAST DISPOSAL AREA, FEBRUARY 1994

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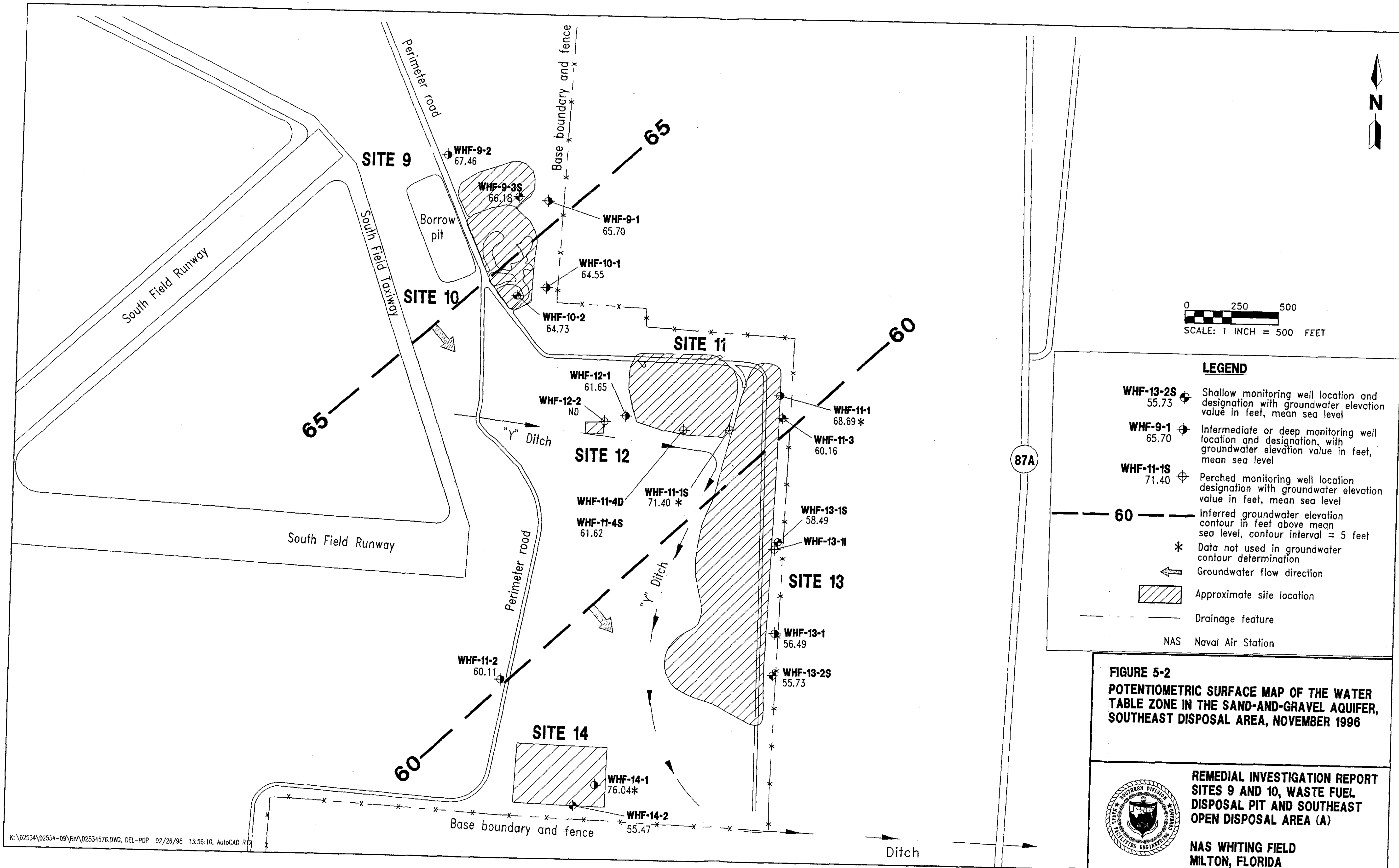


FIGURE 5-2
POTENTIOMETRIC SURFACE MAP OF THE WATER TABLE ZONE IN THE SAND-AND-GRAVEL AQUIFER, SOUTHEAST DISPOSAL AREA, NOVEMBER 1996

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD
MILTON, FLORIDA

Horizontal Hydraulic Gradients. Table 5-3 provides a summary of the horizontal hydraulic gradients calculated for the Southeast Disposal Area sites during the RI field program. The horizontal hydraulic gradients in the area ranged from .0021 feet per foot (ft/ft) to 0.0036 ft/ft. The average horizontal hydraulic gradient ranged from 0.0026 ft/ft for the February 1994 monitoring event to 0.0033 ft/ft for the April 1996 monitoring event. The overall average horizontal hydraulic gradient for all measured events from 1993 through 1997 was 0.0030 ft/ft. Two anomalous water-level measurements were excluded from the above averages due to potential data errors. These exclusions were monitoring well WHF-10-2 for October 1994 and monitoring well WHF-14-2 for November 1996.

Vertical Hydraulic Gradients. Table 5-4 presents a summary of the vertical hydraulic gradients calculated for the Southeast Disposal Area sites during the RI field program. Because of the limited number of intermediate monitoring well clusters, the vertical hydraulic gradients were calculated using WHF-14-1 and WHF-14-2 during Phase IIA and IIB. With the installation of two additional well clusters during Phase IIB at Site 11 (WHF-11-4S/WHF-11-4D) and Site 13 (WHF-13-1S/WHF-13-1I), vertical hydraulic gradients were also calculated at these sites using November 1996, January 1997, and August 1997 data.

A downward vertical gradient of 0.024 ft/ft was measured at both Site 11 and Site 13 during the November 1996 event and at Site 11 during the August 1997 event. The downward gradient is in contrast to the consistently upward gradient measured during the remaining events.

The vertical hydraulic gradient for monitoring wells WHF-14-1 and WHF-14-2 ranged from 0.0127 ft/ft (January 1995) to 0.0158 ft/ft (November 1996). All vertical hydraulic gradients for this well cluster were determined to be in an upward direction, which suggests that the southeast area may be considered a discharge zone for groundwater.

Hydraulic Conductivity and Seepage Velocity. Slug tests were conducted at five shallow monitoring wells in the Southeast Disposal Area during the RI. Table 5-5 summarizes the hydraulic conductivity values and geometric mean calculated for monitoring wells in the Southeast Disposal Area. As shown in Table 5-5, all slug test trials on monitoring well WHF-11-2 were rejected because data were extremely varied and unpredictable. In addition, hydraulic conductivity data from monitoring well WHF-10-2 were rejected because they exceeded the 20 percent variance criteria in the data validation procedure. The validation of hydraulic conductivity data is presented in Section 2.3 in Table 2-2 of Technical Memorandum No. 4, Hydrogeologic Assessment, January 1995 (ABB-ES, 1995c).

Average hydraulic conductivity values for individual monitoring wells ranged from 4.73 feet per day (ft/day) (1.67×10^{-3} centimeters per second [cm/sec]) for WHF-11-3 to 14.55 ft/day (5.13×10^{-3} cm/sec) for WHF-13-2S. Monitoring wells selected from the Southeast Disposal Area were screened within well-graded to poorly graded sand between 27 to 59 feet above mean sea level (msl). The geometric mean for the hydraulic conductivity data of monitoring wells in the area was 8.38 ft/day (2.96×10^{-3} cm/sec) as shown in Table 5-5.

Seepage Velocity. The seepage velocity was calculated by multiplying the hydraulic conductivity (K) by the hydraulic gradient and dividing by the effective porosity (n). Table 5-6 summarizes the average linear pore water velocity (i.e., seepage velocity) for the water table zone of the sand-and-gravel aquifer for

Table 5-3
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	September 30 to October 1, 1993		February 8 and 9, 1994	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	60.07	0.0026	57.50	--
WHF-10-2		58.71		56.17	
WHF-9-1	460	59.83	0.0027	57.21	--
WHF-10-1		58.61		56.11	
WHF-9-2	842	61.04	0.0028	58.38	--
WHF-10-2		58.71		56.17	
WHF-11-3	1,381	55.28	0.0029	52.97	--
WHF-13-2		51.25		49.01	
WHF-11-2	1,123	54.62	0.0031	52.19	--
WHF-14-1		51.20		48.90	
WHF-9-2	3,547	61.04	0.0029	58.38	--
WHF-14-2		50.65		48.35	
		Average Gradient	0.0028		--

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	June 22 to 24, 1994		October 10 to 13, 1994	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	58.57	0.0027	64.69	--
WHF-10-2		57.13		37.73	
WHF-9-1	460	58.36	0.0027	64.35	0.0023
WHF-10-1		57.13		63.28	
WHF-9-2	842	59.12	0.0024	65.58	--
WHF-10-2		57.13		37.73	
WHF-11-3	1,381	54.11	0.0030	60.03	0.0030
WHF-13-2		49.93		55.86	
WHF-11-2	1,123	53.15	0.0032	59.33	0.0031
WHF-14-1		49.57		55.81	
WHF-9-2	3,547	59.12	0.0029	65.58	0.0029
WHF-14-2		48.94		55.24	
		Average Gradient	0.0029		0.0028

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 10 to 13, 1995		April 19 and 20, 1995	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	64.12	0.0026	64.05	0.0027
WHF-10-2		62.75		62.65	
WHF-9-1	460	63.73	0.0021	63.82	0.0026
WHF-10-1		62.76		62.61	
WHF-9-2	842	65.08	0.0028	64.93	0.0027
WHF-10-2		62.75		62.65	
WHF-11-3	1,381	59.22	0.0029	59.45	0.0031
WHF-13-2		55.20		55.22	
WHF-11-2	1,123	58.90	0.0031	58.56	0.0032
WHF-14-1		55.39		55.02	
WHF-9-2	3,547	65.08	0.0029	64.93	0.0030
WHF-14-2		54.87		54.39	
		Average Gradient	0.0027		0.0029

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	July 28 and 29, 1995		October 12 to 14, 1995	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	64.95	0.0026	64.71	0.0029
WHF-10-2		63.60		63.20	
WHF-9-1	460	64.54	0.0022	64.28	0.0025
WHF-10-1		63.51		63.11	
WHF-9-2	842	65.92	0.0028	65.72	0.0030
WHF-10-2		63.60		63.20	
WHF-11-3	1,381	59.88	0.0023	59.38	0.0033
WHF-13-2		56.77		54.88	
WHF-11-2	1,123	59.39	0.0032	58.67	0.0034
WHF-14-1		55.79		54.85	
WHF-9-2	3,547	65.92	0.0030	65.72	0.0032
WHF-14-2		55.25		54.25	
		Average Gradient	0.0027		0.0031

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 19 and 20, 1996		April 25 to 27, 1996	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	70.07	0.0030	70.89	0.0030
WHF-10-2		68.50		69.31	
WHF-9-1	460	69.64	0.0027	70.56	0.0029
WHF-10-1		68.40		69.24	
WHF-9-2	842	71.04	0.0030	71.94	0.0031
WHF-10-2		68.50		69.31	
WHF-11-3	1,381	64.50	0.0033	65.51	0.0036
WHF-13-2		59.95		60.60	
WHF-11-2	1,123	64.09	0.0036	64.59	0.0036
WHF-14-1		60.09		60.55	
WHF-9-2	3,547	71.04	0.0033	71.94	0.0034
WHF-14-2		59.50		59.90	
		Average Gradient	0.0032		0.0033

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	July 25 to 27, 1996		November 7 to 9, 1996	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	69.55	0.0028	66.18	0.0028
WHF-10-2		68.09		64.73	
WHF-9-1	460	69.11	0.0026	65.70	0.0025
WHF-10-1		67.91		64.55	
WHF-9-2	842	70.80	0.0032	67.46	0.0032
WHF-10-2		68.09		64.73	
WHF-11-3	1,381	63.41	0.0032	60.16	0.0032
WHF-13-2		58.98		55.73	
WHF-11-2	1,123	63.54	0.0036	60.11	--
WHF-14-1		59.50		76.04	
WHF-9-2	3,547	70.80	0.0033	67.46	0.0034
WHF-14-2		58.97		55.47	
		Average Gradient	0.0031		0.0030

See notes at end of table.

Table 5-3 (Continued)
Summary of Horizontal Hydraulic Gradients

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Designation	Distance Between Wells (feet)	January 16 to 18, 1997		August 7 to 9, 1997	
		Water Level (msl)	Horizontal Gradient (ft/ft)	Water Level (msl)	Horizontal Gradient (ft/ft)
Southeast Disposal Area					
WHF-9-3S	526	63.84	0.0028	62.16	0.0028
WHF-10-2		62.37		60.67	
WHF-9-1	460	63.48	0.0027	61.86	0.0028
WHF-10-1		62.23		60.57	
WHF-9-2	842	65.06	0.0032	63.19	0.0030
WHF-10-2		62.37		60.67	
WHF-11-3	1,381	58.04	0.0031	57.06	0.0031
WHF-13-2		53.76		52.72	
WHF-11-2	1,123	57.83	0.0036	55.92	0.0036
WHF-14-1		53.84		52.58	
WHF-9-2	3,547	65.06	0.0033	63.19	0.0031
WHF-14-2		53.25		52.17	
		Average Gradient	0.0031		0.0031

Notes: msl = mean sea level.
ft/ft = feet per foot.
-- = no data.

Table 5-4
Summary of Vertical Hydraulic Gradients
Southeast Disposal Area

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Well Screens (feet)	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
September 30 and October 1, 1993					
WHF-14-2	27.5	41.01	50.65	0.0134	Upward
WHF-14-1	-13.51		51.20		
February 8 and 9, 1994					
WHF-14-2	27.5	41.01	48.35	0.0134	Upward
WHF-14-1	-13.51		48.90		
June 22 to 24, 1994					
WHF-14-2	27.5	41.01	48.94	0.0154	Upward
WHF-14-1	-13.51		49.57		
October 10 to 13, 1994					
WHF-14-2	27.5	41.01	55.24	0.0139	Upward
WHF-14-1	-13.51		55.81		
January 10 to 13, 1995					
WHF-14-2	27.5	41.01	54.87	0.0127	Upward
WHF-14-1	-13.51		55.39		
April 19 and 20, 1995					
WHF-14-2	27.5	41.01	54.39	0.0154	Upward
WHF-14-1	-13.51		55.02		
July 28 and 29, 1995					
WHF-14-2	27.5	41.01	55.25	NC	NC
WHF-14-1	-13.51		55.79		
October 12 and 14, 1995					
WHF-14-2	27.5	41.01	54.25	0.0146	Upward
WHF-14-1	-13.51		54.85		
January 19 and 29, 1996					
WHF-14-2	27.5	41.01	59.50	0.0144	Upward
WHF-14-1	-13.51		60.09		

See notes at end of table.

Table 5-4 (Continued)
Summary of Vertical Hydraulic Gradients
Southeast Disposal Area

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Number	Bottom of Well Elevation (msl)	Vertical Distance Between Well Screens (feet)	Groundwater Elevation (msl)	Vertical Gradient (ft/ft)	Vertical Flow Direction
April 25 to 27, 1996					
WHF-14-2	27.5	41.01	59.90	0.0158	Upward
WHF-14-1	-13.51		60.55		
July 25 to 27, 1996					
WHF-14-2	27.5	41.01	58.97	0.0129	Upward
WHF-14-1	-13.51		59.50		
November 7 to 9, 1996					
WHF-14-2	27.5	41.01	55.47	NC	NC
WHF-14-1	-13.51		76.04		
WHF-13-1S	47.67	29.5	58.49	0.0261	Downward
WHF-13-1I	18.17		57.72		
WHF-11-4S	50.43	30.49	61.62	0.0126	Downward
WHF-11-4D	19.94		60.90		
January 16 and 18, 1997					
WHF-14-2	27.5	41.01	53.25	0.0144	Upward
WHF-14-1	-13.51		53.84		
WHF-13-1S	47.67	29.5	56.70	0.0092	Upward
WHF-13-1I	18.17		56.97		
WHF-11-4S	50.43	30.49	59.36	0.0066	Upward
WHF-11-4D	19.94		59.56		
August 7 to 9, 1997					
WHF-14-2	27.5	41.01	52.17	0.010	Upward
WHF-14-1	-13.51		52.58		
WHF-13-1S	47.67	29.5	55.42	0.0041	Upward
WHF-13-1I	18.17		55.54		
WHF-11-4SZ	50.43	30.49	58.24	0.0039	Downward
WHF-11-4D	19.94		58.12		

Notes: msl = mean sea level.
ft/ft = feet per foot.
NC = not calculated due to interpreted measurement error.

Table 5-5
Summary of Hydraulic Conductivity (K) Data from Slug Tests

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Well Number	Range of K (ft/day)	Number of Usable Runs	Average K (ft/min)	Average K (ft/day)	Average K (cm/sec)
Southeast Disposal Area					
Site 10, Southeast Open Disposal Area (A)					
WHF-10-2	R	R	R	R	R
Site 11, Southeast Open Disposal Area (B)					
WHF-11-2	R	R	R	R	R
WHF-11-3	4.41 to 5.23	3	0.0033	4.73	1.67×10^{-3}
Site 13, Sanitary Landfill					
WHF-13-2S	13.23 to 15.51	6	0.0101	14.55	5.13×10^{-3}
Site 14, Short-Term Sanitary Landfill					
WHF-14-2	8.53 to 8.57	2	0.0059	8.55	3.02×10^{-3}
			Geometric Mean	8.38	2.96×10^{-3}

Notes: Average is the arithmetic average.

ft/day = feet per day.
ft/min = feet per minute.
cm/sec = centimeters per second.
R = data rejected.

Table 5-6
Summary of Seepage Velocities

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Investigation Area	Sites	Monitoring Well Pair	Horizontal[1] Gradient (ft/ft)	K (ft/day)	Effective Porosity (n)	Seepage Velocity (ft/day)
Southeast Disposal Area	11 and 13	WHF-11-3 and WHF-13-2	0.0029	[2]9.65	0.35	0.079
	9, 10, 11, 13, and 14	WHF-9-2 and WHF-14-2	0.0029	[3]8.37	0.35	0.069
				Arithmetic average		0.074

[1] Horizontal gradients are based on groundwater measurements from September 1993 through November 1996.
[2] The K is averaged where values are available for both wells in the well pair.
[3] Geometric mean for the area.

Notes: ft/ft = feet per foot.
K = hydraulic conductivity (ft/day).
ft/day = feet per day.

sites in the Southeast Disposal Area. The calculations are based on an assumed effective porosity (n) of 0.35 for the site soil. The effective porosity (n) value represents silty through poorly graded sands (Fetter, 1988). Seepage velocities ranged from 0.069 ft/day at Sites 9, 10, 11, 13, and 14 to 0.079 ft/day at Sites 11 and 13. The average seepage velocity for the Southeast Disposal Area sites was 0.074 ft/day (27 feet per year [ft/yr]).

5.5 SURFACE SOIL ASSESSMENT. The surface soil samples at Sites 9 and 10 were analyzed for TCL VOCs, SVOCs, pesticides and PCBs, TAL inorganics, and TRPH. For Site 9, the surface soil assessment included the collection of five surface soil samples (plus one duplicate sample) during Phase IIB. For Site 10, the surface soil assessment included the collection of five surface soil samples during Phase IIA and six surface soil samples (plus two duplicate samples) during Phase IIB of the RI.

Site 9. Table 5-7 summarizes the analytical results for organic and inorganic analytes detected in five surface soil samples (and one duplicate) at Site 9. The sample locations are shown on Figure 3-2.

Table 5-8 summarizes the frequency of detection, range of reporting limits, range of detected concentrations, mean of detected concentrations, and background screening values for Site 9 surface soil samples. In addition, Table 5-8 shows the residential and industrial Florida SCTLs and RBCs for analytes detected in Site 9 surface soil. If a compound or analyte was detected in groundwater above the Florida groundwater cleanup target levels (GCTLs), the leachability value was also included in Table 5-8 for comparison.

Total Recoverable Petroleum Hydrocarbons. All five samples had estimated detections of TRPH ranging from 4.5 mg/kg to 5.9 mg/kg, which is below the Florida SCTL of 350 mg/kg.

TCL VOCs. No VOCs were detected in the surface soil samples.

Table 5-7
Summary of Analytes Detected in Site 9 Surface Soil

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample No.	09S00101	09S00201	09S00301	09S00301D	09S00401	09S00501
Collect Date	12/06/95	12/06/95	12/06/95	12/06/95	12/06/95	12/06/95
TRPH (mg/kg)	4.5 J	4.6 J	4.7 J	4.7 J	5.9 J	5.7 J
Volatile Organic Compounds (µg/kg)						
None detected						
Semivolatile Organic Compounds (µg/kg)						
1,2,4-Trichlorobenzene	--	--	--	--	--	110 J
1,4-Dichlorobenzene	--	--	--	--	--	120
Pesticides and PCBs (µg/kg)						
None detected						
Inorganic Compounds (mg/kg)						
Aluminum	25,800	17,500	25,200	33,100	29,300	--
Antimony	--	8.3 J	--	--	--	12.0
Arsenic	10.1	4.1	8.5	7.1	10.1	2.8
Barium	7.5 J	5.5 J	8.9 J	21.7 J	11.7 J	--
Beryllium	0.11 J	0.08 J	0.12 J	0.22 J	0.14 J	--
Calcium	--	--	--	384 J	--	--
Chromium	46.2	14.9	21.7	29.5	31.4	--
Cobalt	--	--	0.52 J	0.55 J	--	--
Copper	6.6	4.5 J	--	9	7.5	--
Iron	29,800	12,300	17,800	26,500	23,900	--
Lead	4.5	6.8	11.2	6.6	12.3	3.1
Magnesium	104 J	73.3 J	143 J	227 J	147 J	--
Manganese	10.1 J	21 J	28.2 J	52.9 J	22.2 J	--
Mercury	0.01 J	0.01 J	0.01 J	0.01 J	0.03 J	--
Nickel	3.9 J	2.9 J	--	6.1 J	--	--
Potassium	--	--	--	212 J	--	--
Vanadium	76.7	32.2	43.5	65.1	64.7	--
Zinc	--	3.8 J	6.3	14.4	6.9	--

Notes: mg/kg = milligrams per kilogram.
µg/kg = micrograms per kilogram.
PCB = polynuclear chlorinated biphenyl.
TRPH = total recoverable petroleum hydrocarbons.
J = estimated value.
-- = analyte not detected.

Table 5-8
Comparison of Analytes Detected in Site 9 Surface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/Industrial[4]	FDEP Soil Cleanup Target Levels Residential/Industrial/ Leachability[5]
Semivolatile Organic Compounds (μg/kg)						
1,2,4-Trichlorobenzene	1/5	370 to 470	110	NA	[7]78,000/2,000,000	560,000/3,000,000/NA
1,4-Dichlorobenzene	1/5	370 to 470	120	NA	[6]27,000/240,000	5,600/8,300/NA
Inorganic Analytes (mg/kg)						
Aluminum	4/5	40	17,500 to 29,300	15,848	[7]7,800/200,000	72,000/1,000,000/SPLP
Antimony	1/5	12	8.3	8	[7]3.1/82	26/240/NA
Arsenic	5/5	2	2.8 to 10.1	3.2	[6]0.43/3.8	0.8/[12]4.62/NA
Barium	4/5	40	5.5 to 15.3	23.2	[7]550/14,000	105/87,000/NA
Beryllium	4/5	1	0.08 to 0.17	0.36	[7]16/410	120/700/NA
Calcium	1/5	1,000	442	395	--/--	--/--/NA
Chromium[8]	4/5	2	14.9 to 46.2	11	[7]23/610	290/430/NA
Cobalt	1/5	10	0.535	3	[7]470/12,000	4,700/110,000/NA
Copper	4/5	5	4.5 to 7.5	9.4	[7]310/8,200	105/12,000/NA
Iron	4/5	20	12,300 to 29,800	8,832	[7]2,300/61,000	23,000/490,000/NA
Lead	5/5	0.6	3.1 to 12.3	11.4	[10]400	500/920/NA
Magnesium	4/5	1,000	73.3 to 185	268	--/--	--/--/NA
Manganese	4/5	3	10.1 to 40.55	392	[7]160/4,100	1,600/20,000/NA
Mercury	4/5	0.1	0.01 to 0.03	0.12	[7]2.3/61	3.7/28/NA
Nickel	3/5	8	2.9 to 5.05	7.2	[7]160/4,100	105/28,000/NA
Potassium	1/5	1,000	356	177	--/--	--/--/NA

See notes at end of table.

Table 5-8 (Continued)
Comparison of Analytes Detected in Site 9 Surface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/ Industrial[4]	FDEP Soil Cleanup Target Levels Residential/Industrial/ Leachability[5]
Inorganic Analytes (mg/kg) (continued)						
Vanadium	4/5	10	32.2 to 76.7	21.8	[7]55/1,400	15/7,700/NA
Zinc	3/5	4	3.8 to 10.35	15.4	[7]2,300/61,000	23,000/560,000/NA

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] If the target analyte is not detected in either the environmental sample or associated duplicate, the value used for the nondetection is one-half the reporting limit.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[5] Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.
[6] The values correspond to a human cancer risk level of 1 in 1,000,000.
[7] The calculated values correspond to a noncancer hazard quotient of 0.1.
[8] Hexavalent chromium.
[9] Value is an Florida Department of Environmental Protection-approved site-specific cleanup goal for arsenic at landfill sites, NAS Whiting Field (Appendix J).
[10] Source: Office of Solid Waste and Emergency Response memorandum dated July 14, 1994.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 09S00101 through 09S00501
Duplicate sample: 09S00301D
Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.
Background duplicate sample: BKS00201D

USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
FDEP = Florida Department of Environmental Protection.
μg/kg = micrograms per kilogram.
NA = not applicable.
mg/kg = milligrams per kilogram.
-- = number is greater than 1×10^6 or unlisted.
SPLP = synthetic precipitation leaching procedure; leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels.

TCL SVOCs. Two SVOCs (1,2,4-trichlorobenzene and 1,4-dichlorobenzene) were detected in a surface soil sample collected from soil boring 9-SB-05 (Figure 3-2). Concentrations per of these compounds were orders of magnitude below all screening values Table 5-8.

Pesticides and PCBs. No pesticide or PCB compounds were detected.

TAL Metals and (Total) Cyanide. Eighteen TAL metals were detected in the surface soil samples. Nine metals (aluminum, antimony, arsenic, calcium, chromium, iron, lead, potassium, and vanadium) were detected in one or more samples at concentrations that exceeded their respective background screening values (Table 5-8). Six metals (aluminum, antimony, arsenic, chromium, iron, and vanadium) exceeded at least one regulatory screening value for that particular metal. Arsenic exceeded the site-specific cleanup goal of 4.62 mg/kg in three of the five samples and associated duplicate sample. Aluminum, antimony, and chromium exceeded the residential RBC. Iron and vanadium exceeded the Florida SCTL and RBC for a residential scenario.

Aluminum was the only analyte present in groundwater at a concentration above the Florida GCTL. The leachability SCTL for aluminum may be derived from the synthetic precipitation leaching procedure (SPLP) and is not available for comparison. However, the aluminum detections were below the residential SCTL.

Site 10. Five samples were collected during Phase IIA, and six samples (plus two duplicate samples) were collected during Phase IIB at Site 10. Table 5-9 summarizes the analytical results for organic and inorganic analytes detected in surface soil samples from Phase IIA (1992). Table 5-10 summarizes the analytical results for organic and inorganic analytes detected in surface soil samples from Phase IIB (1995-96). The sample locations are shown on Figure 3-2.

Table 5-11 summarizes the frequency of detection, range of reporting limits, range of detected concentrations, mean of detected concentrations, and background screening values for Site 10 surface soil samples. In addition, Table 5-11 shows the residential and industrial Florida SCTLs and RBCs for analytes detected in Site 10 surface soil. If a compound or analyte was detected in groundwater above the Florida GCTLs, the leachability value was also included in Table 5-11 for comparison.

Total Recoverable Petroleum Hydrocarbons. No Phase IIA surface soil samples had detectable concentrations of TRPH. For Phase IIB, three of the six sample locations had detectable TRPH concentrations above the IDL. One sample (10S00301) had a TRPH concentration (666 mg/kg) greater than the Florida SCTL of 350 mg/kg.

TCL VOCs. Two VOCs, acetone and 2-hexanone, were detected at concentrations below regulatory screening values in the Phase IIA and IIB soil samples.

TCL SVOCs. Eleven SVOCs were detected in four surface soil samples (10-SL-01, 10-SL-02, 10-SL-03, and 10-SL-04) collected during Phase IIA. For Phase IIB, 18 SVOCs were detected in at least one or more surface soil samples. Five of the SVOCs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) detected during the Phase IIA and IIB investigations exceeded at least one of the screening criteria (Table 5-11).

Table 5-9
Summary of Analytical Results for Phase IIA Surface Soil Samples, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sampler Identifier:	10-SL-01	10-SL-02	10-SL-03	10-SL-04	10-SL-05
Collect Date:	12-AUG-92	12-AUG-92	12-AUG-92	12-AUG-92	12-AUG-92
TRPH (mg/kg)	--	--	--	--	--
Volatile Organic Compounds (μg/kg)					
Xylenes (total)	--	--	--	1 J	--
Semivolatile Organic Compounds (μg/kg)					
Benzo(a)anthracene	81 J	57 J	59 J	42 J	--
Benzo(a)pyrene	46 J	45 J	--	--	--
Benzo(b)fluoranthene	71 J	78 J	62 J	--	--
Benzo(k)fluoranthene	76 J	74 J	62 J	--	--
Butylbenzylphthalate	46 J	85 J	40 J	--	--
Chrysene	100 J	64 J	78 J	45 J	--
Diethylphthalate	--	--	96 J	--	--
Fluoranthene	130 J	69 J	96 J	59 J	--
Phenanthrene	94 J	--	48 J	36 J	--
Pyrene	140 J	87 J	85 J	45 J	--
bis(2-Ethylhexyl)phthalate	95 J	130 J	100 J	57 J	--
Pesticides and PCBs (μg/kg)					
4,4'-DDT	15 J	14 J	33 J	--	--
Aroclor-1254	210 J	210 J	310 J	--	--
Aroclor-1260	49 J	60 J	--	--	--
Target Analyte List Metals (mg/kg)					
Aluminum	11,300	21,600	13,500	37,000	23,200
Arsenic	4.1	6.9	5.4	8.8	6.1
Barium	9 J	31.5 J	9.7 J	17.5 J	7.5 J
Beryllium	0.14 J	0.18 J	0.12 J	0.21 J	--
Cadmium	0.89 J	2.4	2.3	--	--
Calcium	620 J	1,620 J	583 J	1,720	157 J
Chromium	13.2	29.9	19.4	31.9	21.2
Cobalt	1.4 J	2.4 J	1.1 J	1.8 J	2.1 J
Copper	7.4	24.2	15.8	13	6.6 J
Iron	10,000	19,600	13,200	23,800	16,100
Lead	19 J	47	34.1	29.3	12.5 J
Magnesium	121 J	191 J	96.1 J	294 J	106 J
Manganese	41.9	70.5	389	57.1	--
Mercury	--	--	0.2	--	--
Nickel	--	4.9 J	4.2 J	3.5 J	--
Sodium	182 J	290 J	228 J	387 J	289 J
Vanadium	25	48.1	35.7	63.4	41.1

See notes at end of table.

Table 5-9 (Continued)
Summary of Analytical Results for Phase IIA Surface Soil Samples, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sampler Identifier:	10-SL-01	10-SL-02	10-SL-03	10-SL-04	10-SL-05
Collect Date:	12-AUG-92	12-AUG-92	12-AUG-92	12-AUG-92	12-AUG-92
Target Analyte List Metals (mg/kg) (continued)					
Zinc	23.9 J	92.7 J	705	42.5 J	11.3 J

Notes: TRPH = total recoverable petroleum hydrocarbons.
mg/kg = milligrams per kilogram.
-- = the analyte was not detected during laboratory analysis.
μg/kg = micrograms per kilogram.
J = the associated numerical value is an estimated quantity.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.

Table 5-10
Summary of Analytes Detected for Phase IIB Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	10S00101	10S00101D (Duplicate)	10S00201	10S00201D (Duplicate)	10S00301	10S00401	10S00501	10S00601
Collect Date:	12/07/95	1/05/96	1/05/96	1/05/96	1/05/96	12/07/95	1/05/96	12/07/95
TRPH (mg/kg)	--	--	105	66.1	666	--	3.3	--
Volatile Organic Compounds (μg/kg)								
2-Hexanone	--	--	--	4 J	--	--	--	--
Semivolatile Organic Compounds (μg/kg)								
Acenaphthene	--	--	--	40 J	110 J	--	--	--
Anthracene	--	270 J	--	54 J	200 J	--	--	--
Benzo(a)anthracene	340	1,200	87 J	190 J	490	1,400 J	--	--
Benzo(a)pyrene	400	1,000	95 J	150 J	350 J	2,500	--	--
Benzo(b)fluoranthene	480	1,300	150	200 J	530 J	2,500	92 J	--
Benzo(g,h,i)perylene	180 J	340 J	--	--	--	3,800	--	--
Benzo(k)fluoranthene	360 J	900	110 J	210 J	420 J	2,300	--	--
Butylbenzylphthalate	--	--	57 J	--	--	--	--	--
Carbazole	--	100 J	--	84 J	160 J	--	--	--
Chrysene	500	1,400	120 J	220 J	510	1,600 J	40 J	--
Dibenzo(a,h)anthracene	--	170 J	--	--	--	1,000 J	--	--
Dibenzofuran	--	--	--	--	52 J	--	--	--
Diethylphthalate	--	--	--	--	96 J	--	--	--
Fluoranthene	660	2,300	160 J	420	880	1,400 J	--	--
Fluorene	--	--	--	--	120 J	--	--	--
Indeno(1,2,3-cd)pyrene	180 J	360 J	58 J	56 J	150 J	3,200	--	--
Phenanthrene	280 J	1,200	68 J	310 J	700	--	--	--
Pyrene	580	1,600	170 J	290 J	1,000	1,800	46 J	--
bis(2-Ethylhexyl)phthalate	200 J	--	--	140 J (3,300 DL[1])	160 J	--	--	--
Pesticides and PCBs (μg/kg)								
4,4'-DDD	--	--	--	--	4.4 J	--	--	--
4,4'-DDE	--	--	--	--	--	37	--	--

See notes at end of table.

Table 5-10 (Continued)
Summary of Analytes Detected in Phase IIB Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier	10S00101	10S00101D (Duplicate)	10S00201	10S00201D (Duplicate)	10S00301	10S00401	10S00501	10S00601
Collect Date	12/07/95	1/05/96	1/05/96	1/05/96	1/05/96	12/07/95	1/05/96	12/07/95
Pesticides and PCBs (µg/kg) **(continued)**								
4,4'-DDT	--	--	7 J	8.9 J	--	35	2.1	12
Aroclor-1254	--	--	340 J	390	51 J	--	--	--
Aroclor-1260	--	--	--	--	--	--	--	--
Dieldrin	--	--	--	--	--	19	--	--
Heptachlor	--	--	--	--	--	--	--	5.2
Heptachlor epoxide	--	--	--	--	--	--	--	2.4
alpha-Chlordane	--	--	--	--	--	5.2 J	--	1.1 J
gamma-Chlordane	--	--	--	--	--	--	--	6.4
Inorganic Compounds (mg/kg)								
Aluminum	8,760	8,920	8,960	5,860	10,200	29,300	9,740	11,300
Arsenic	2.5	2.6	3.6	2.4	2.7	6.1	3.8	3.1
Barium	361 J	--	9.2 J	8.1 J	24 J	24 J	8.4 J	9.2 J
Beryllium	--	0.13 J	0.1 J	0.06 J	0.11 J	0.26 J	0.11 J	--
Cadmium	0.91 J	--	1.4	1.3	0.77 J	--	0,5 J	--
Calcium	23,200	17,800	1,320	779 J	1,080 J	1,090 J	239 J	259 J
Chromium	18.2	16.8	16	12.2	11.7	25	10.1	18
Cobalt	0.83 J	2 J	0.79 J	0.82 J	--	1.7 J	0.86 J	0.93 J
Copper	7.9	7.9	10.8	11.5	11.2	10.4 J	5.2 J	--
Cyanide	0.1 J	0.2 J	0.2 J	0.13 J	0.13 J	0.11 J	0.12 J	--
Iron	6,520	6,700	9,660	8,650	8,880	19,100	8,860	9,080
Lead	38 J	33.1 J	32.5	29	47.8	25.9 J	8.6	9.2 J
Magnesium	5,910	5,600	200 J	100 J	122 J	397 J	77.7 J	123 J
Manganese	56.6 J	66 J	39.3	36.4	41.5	107 J	38	71.2 J
Mercury	0.07	0.07	--	--	0.08	0.04 J	--	0.01 J
Nickel	6.8 J	3 J	2 J	--	--	6.5 J	--	7 J

See notes at end of table.

Table 5-10 (Continued)
Summary of Analytes Results Detected in Phase IIB Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	10S00101	10S00101D (Duplicate)	10S00201	10S00201D (Duplicate)	10S00301	10S00401	10S00501	10S00601
Collect Date:	12/07/95	1/05/96	1/05/96	1/05/96	1/05/96	12/07/95	1/05/96	12/07/95
Inorganic Compounds (mg/kg) (continued)								
Potassium	219 J	--	69.4 J	--	109 J	299 J	70.5 J	--
Selenium	--	--	--	--	--	0.29 J	--	--
Sodium	--	--	181 J	192 J	171 J	--	160 J	--
Thallium	--	--	--	--	--	--	0.13 J	--
Vanadium	18.9	18.7	24.5	20.8	24.3	49.4	21.2	21.8
Zinc	37.7	34.1	50	42.9	44.8	30	11.2	--

Notes: *mg/kg = milligrams per kilogram.*
μg/kg = micrograms per kilogram.
DL[1] = diluted for reanalysis of one or more target analytes.
-- = analyte not detected.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
PCB = polynuclear chlorinated biphenyl.
TRPH = total recoverable petroleum hydrocarbons.
J = estimated value.

Table 5-11
Comparison of Analytes Detected in Site 10 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/ Industrial[4]	FDEP Soil Cleanup Target Levels Residential/Industrial/Leachability[5]
Volatile Organic Compounds (μg/kg)						
2-Hexanone	1/11	11 to 12	4.75 *	--	310,000/M	5,100/34,000/1,400
Xylenes (total)	1/11	5 to 12	1	--	M/M	5,900,000/40,000,000/200
Semivolatile Organic Compounds (μg/kg)						
Acenaphthene	2/11	350 to 1,600	110 to 115 *	--	470,000/M	1,900,000/18,000,000/2,100
Anthracene	3/11	350 to 1,600	122 * to 227.5 *	--	M/M	18,000,000/260,000,000/2,500,000
Benzo(a)anthracene	8/11	350 to 1,600	42 to 1,400	--	870/7,800	1,400/5,000/3,200
Benzo(a)pyrene	6/11	350 to 1,600	45 to 2,500	--	87/780	100/500/8,000
Benzo(b)fluoranthene	8/11	350 to 1,600	62 to 2,500	--	870/7,800	1,400/4,800/10,000
Benzo(g,h,i)perylene	2/11	350 to 1,600	260 * to 3,800	--	--	2,300,000/41,000,000/32,000,000
Benzo(k)fluoranthene	7/11	350 to 1,600	62 to 2,300	--	8,70/78,000	15,000/52,000/25,000
Butylbenzylphthalate	4/11	350 to 1,600	40 to 123.5 *	--	M/M	15,000,000/320,000,000/310,000
Carbazole	3/6	365 to 1,600	137 * to 160	--	32,000/290,000	53,000/190,000/600
Chrysene	9/11	350 to 1,600	40 to 1,600	--	87,000/780,000	140,000/450,000/77,000
Dibenzo(a,h)anthracene	2/11	185 to 380	177.5 * to 1,000	--	87/780	100/500/30,000
Dibenzofuran	1/11	350 to 1,600	52	--	31,000/820,000	280,000/5,000,000/15,000
Diethylphthalate	1/11	350 to 1,600	96	--	M/M	54,000,000/920,000,000/86,000
Fluoranthene	8/11	350 to 1,600	59 to 1,480 *	--	310,000/M	2,900,000/48,000,000/1,200,000
Fluorene	1/11	350 to 1,600	120	--	310,000/M	2,200,000/28,000,000/160,000
Indeno(1,2,3-cd)pyrene	4/11	350 to 1,600	57 * to 3,200	--	870/7,800	1,500/5,300/28,000

See notes at end of table.

Table 5-11 (Continued)
Comparison of Analytes Detected in Site 10 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/ Industrial[4]	FDEP Soil Cleanup Target Levels Residential/Industrial[5]
Semivolatile Organic Compounds (μg/kg)--continued						
Phenanthrene	6/11	350 to 1,600	36 to 740 *	--	--	2,000,000/30,000,000/250,000
Pyrene	9/11	350 to 1,600	45 to 1,800	--	230,000/M	2,200,000/37,000,000/880,000
bis(2-Ethylhexyl)phthalate	7/11	350 to 1,600	57 to 1,720	--	46,000/410,000	76,000/280,000/3,600,000
Pesticides and PCBs (μg/kg)						
4,4'-DDD	1/11	3.6 to 170	4.4	--	2,700/24,000	4,600/18,000/4,000
4,4'-DDE	1/11	3.6 to 170	37	--	1,900/17,000	3,300/13,000/18,000
4,4'-DDT	7/11	3.8 to 170	2.1 to 35	--	1,900/17,000	3,300/13,000/11,000
Aroclor-1254	5/11	36 to 1,700	51 to 365 *	--	320/2,900	500/2,100/17,000
Aroclor-1260	2/11	36 to 1,700	49 to 60	--	320/2,900	500/2,100/17,000
Dieldrin	1/11	3.6 to 170	19	--	40/360	70/300/4
Heptachlor	1/11	1.9 to 86	5.2	--	140/1,300	200/900/23,000
Heptachlor epoxide	1/11	1.9 to 86	2.4	--	70/630	100/400/600
alpha-Chlordane	2/11	1.9 to 860	1.1 to 5.2	--	1,800/16,000	3,100/12,000/9,600
gamma-Chlordane	1/11	1.9 to 860	6.4	--	1,800/16,000	3,100/12,000/9,600
Inorganic Analytes (mg/kg)						
Aluminum	11/11	40	7,425 * to 37,000	12,700	[7]7,800/200,000	72,000/--/SPLP*
Arsenic	11/11	2	2.55 * to 8.8	3.2	[5]0.43/3.8	0.8/[9]4.62/29
Barium	11/11	40	7.5 to 190.5 *	23.2	[7]550/14,000	110/87,000/1,600
Beryllium	9/11	0.09 to 1	0.08 * to 0.315 *	0.36	[6]16/410	120/800/63
Cadmium	7/11	0.09 to 1	0.5 to 2.4	0.58	39/1,000	75/1,300/8
Calcium	11/11	1,000	157 to 20,500 *	396	M/M	--/--/--
Chromium	11/11	2	10.1 to 31.9	11	[7]2.3/610	210/410/38
Cobalt	10/11	10	0.805 * to 2.4	3	[7]470/12,000	4,700/110,000/SPLP*

See notes at end of table.

Table 5-11 (Continued)
Comparison of Analytes Detected in Site 10 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Residential/ Industrial[4]	FDEP Soil Cleanup Target Levels Residential/Industrial[5]
<u>Inorganic Analytes</u> (mg/kg) (continued)						
Copper	10/11	5	5.2 to 24.2	9.4	[7]310/8,200	110/76,000/SPLP*
Cyanide	5/11	0.24 to 0.5	0.11 to 0.165 *	0.28	1,600/41,000	30/39,000/40
Iron	11/11	20	6,650 * to 23,800	8,832	[7]2,300/61,000	23,000/480,000/SPLP*
Lead	11/11	0.6 to 1	8.6 to 47.8	11.4	[8]400	400/920/SPLP*
Magnesium	11/11	1,000	77.7 to 5,755 *	268	M/M	--/--/--
Manganese	11/11	3	13.1 to 389	392	[7]160/4,100	1,600/22,000/SPLP*
Mercury	5/11	0.08 to 0.14	0.01 to 0.2	0.12	[7]2.3/61	3.4/26/2.1
Nickel	7/11	2.3 to 8	3 * to 7	7.2	[7]160/4,100	110/28,000/130
Potassium	5/11	129 to 1,000	70.5 to 359.5 *	177	M/M	--/--/--
Selenium	1/11	0.4 to 1	0.29	0.46	390/10,000	390/10,000/5
Sodium	8/11	1,000	160 to 387	406	--	--/--/--
Thallium	1/11	0.44 to 2	0.13	1.16	--	--/--/--
Vanadium	11/11	10	18.8 * to 63.4	21.8	[7]55/1,400	15/7,400/980
Zinc	10/11	4	11.2 to 705	15.4	[7]2,300/61,000	23,000/560,000/6,000
<u>Other</u> (mg/kg)						
TRPH	3/11	1.8	3.3 to 666	--	--	340/2,500/340

See notes at end of table.

Table 5-11 (Continued)
Comparison of Analytes Detected in Site 10 Surface Soil to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The background screening value for organics is the mean detected concentration and will not be used for screening purposes. The background screening value for inorganics is twice the mean of detected concentrations and will be used for screening purposes in the risk assessment.
[4] Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[5] Contaminant Cleanup Target Levels, Chapter 62-777, Florida Administrative Code, May 1999.
[6] The values correspond to a human cancer risk level of 1 in 1,000,000.
[7] The calculated values correspond to a noncancer hazard quotient of 0.1.
[8] Source: Office of Solid Waste and Emergency Response memorandum dated July 14, 1994.
[9] *Value is a Florida Department of Environmental Protection approved site-specific cleanup goal for arsenic at landfill sites, NAS Whiting Field (Appendix J).*

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 10-SL-01 through 10-SL-05, 10S00101, 10S00201, 10S00301, 10S00401, 10S00501, 10S00601.
Duplicate sample: 10S00101D, 10S00201D.
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501.
Background duplicate sample: BKS00201D.

USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
FDEP = Florida Department of Environmental Protection.
μg/kg = micrograms per kilogram.
* = average of a sample and its duplicate.
-- = criteria not available.
M = number is greater than 1×10^{6}.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyldichloroethane.
mg/kg = milligrams per kilogram.
TRPH = total recoverable petroleum hydrocarbons.

Pesticides and PCBs. One pesticide (dichlorodiphenyltrichloroethane [DDT]) and two PCBs (Aroclor-1254 and Aroclor-1260) were detected in Phase IIA soil samples (10-SL-01, 10-SL-02, and 10-SL-03).

Eight pesticides (dichlorodiphenyldichloroethane [DDD], dichlorodiphenyldichloroethene [DDE], DDT, dieldrin, heptachlor, heptachlor epoxide, alpha-chlordane, and gamma-chlordane) were detected in five Phase IIB surface soil samples (10S00201, 10S00301, 10S00401, 10S00501, and 10S00601). In addition, two PCBs (Aroclor-1254 and Aroclor-1260) were detected in two samples (10S00201 and 10S00301), which exceeded the residential RBC as shown in Table 5-11. All other pesticides and PCBs detected were below the RBCs and Florida SCTLs.

TAL Metals and (Total) Cyanide. During analysis of the Phase IIA and IIB surface soil samples, 21 metals and cyanide were detected. Of the 21 metals detected, 14 metals (aluminum, arsenic, barium, cadmium, calcium, chromium, copper, iron, lead, magnesium, mercury, potassium, vanadium, and zinc) were detected in one or more samples at concentrations that exceeded their respective background screening values (Table 5-11).

Six metals (aluminum, barium, beryllium, iron, manganese, and vanadium) exceeded the residential regulatory screening levels but did not exceed the industrial RBC or Florida SCTL for that particular metal (Table 5-11). Arsenic exceeded the site-specific cleanup goal of 4.62 mg/kg in five of the eleven subsurface soil samples collected during Phase IIA and Phase IIB sampling.

5.6 SUBSURFACE SOIL ASSESSMENT. Table 5-12 summarizes the analytical results for organic and inorganic analytes detected in three subsurface soil samples (and one duplicate) from test pits at Site 10. The test pit sample locations are shown on Figure 3-2. Subsurface soil samples were not collected from Site 9 based on the results of the surface soil samples and lack of evidence of buried wastes from the geophysical survey.

Table 5-13 summarizes the frequency of detection, range of detection limits, range of detected concentrations, mean of detected concentrations, background screening values, and regulatory screening criteria for Site 10 subsurface soil samples. No compounds were detected in groundwater at Site 10 above the Florida GCTLs; therefore, the subsurface soil results were not compared to leachability SCTLs.

TCL VOCs. Five VOCs (carbon disulfide, 2-butanone, toluene, ethylbenzene, and total xylenes) were detected in the subsurface soil samples, but did not exceed regulatory screening values.

TCL SVOCs. Eight SVOCs (naphthalene, 2-methylnaphthalene, acenaphthene, dibenzofuran, fluorene, phenanthrene, fluoranthene, and pyrene) were detected in subsurface soil samples collected from TP-10-02 and TP-10-03. All SVOCs were detected below regulatory screening values (Table 5-13).

Pesticides and PCBs. Five pesticide compounds were detected in subsurface soil samples from two test pits (TP-10-02 and TP-10-05). No PCBs were detected. Three of the pesticide compounds (dieldrin, 4,4''-DDE, and 4,4''-DDD) were detected above he CRQLs in one sample (10SS0201) at Site 10. No pesticides were detected

Table 5-12
Summary of Analytical Results Detected in Subsurface Soil Samples, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	10-SS-02-01	10-SS-03-02	10-SS-03-02A	10-SS-05-03
Test Pit Location:	TP-10-02	TP-10-03	TP-10-03	TP-10-05
Sample Depth Interval: (ft bls)	4 to 5	6 to 8	6 to 8	8 to 9.5
Collect Date:	07-OCT-92	07-OCT-92	07-OCT-92	07-OCT-92
Volatile Organic Compounds (μg/kg)				
Carbon disulfide	2 J	3 J	2 J	5 J
2-Butanone	--	62	40	--
Toluene	--	1 J	--	--
Ethylbenzene	20	4 J	2 J	--
Xylenes (total)	4 J	5 J	3 J	1 J
Semivolatile Organic Compounds (μg/kg)				
Naphthalene	160 J	240 J	260 J	--
2-Methylnaphthalene	95 J	160 J	190 J	--
Acenaphthene	110 J	47 J	--	--
Dibenzofuran	82 J	--	--	--
Fluorene	140 J	55 J	--	--
Phenanthrene	77 J	130 J	100 J	--
Fluoranthene	--	70 J	46 J	--
Pyrene	--	--	51 J	--
Pesticides and PCBs (μg/kg)				
Aldrin	3.9 J	--	--	--
Dieldrin	5	--	--	--
4,4'-DDE	9.3	--	--	0.66 J
4,4'-DDD	10	--	--	1.4 J
4,4'-DDT	3.9 J	--	--	--
Inorganic Analytes (mg/kg)				
Aluminum	12,300	11,300	12,700	12,400
Antimony	7.9 J	--	--	--
Arsenic	1.7 J	2.4 J	2.5 J	3.7
Barium	14.6 J	13.5 J	12.5 J	28.2 J
Beryllium	0.4 J	0.13 J	0.21 J	0.16 J
Cadmium	0.91 J	--	--	--
Calcium	4,100	--	--	502 J
Chromium	207	11.9 J	13.6 J	11.2
Cobalt	2.5 J	--	--	--
Copper	11.9	4.7 J	5.5 J	4.5 J
Iron	44,600	7,270	7,720	7,750
Lead	82.4	14.3	13.4	64.8

See notes at end of table.

Table 5-12 (Continued)
Summary of Analytical Results Detected in Subsurface Soil Samples, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	10-SS-02-01	10-SS-03-02	10-SS-03-02A	10-SS-05-03
Test Pit Location:	TP-10-02	TP-10-03	TP-10-03	TP-10-05
Sample Depth Interval: (ft bls)	4 to 5	6 to 8	6 to 8	8 to 9.5
Collect Date:	07-OCT-92	07-OCT-92	07-OCT-92	07-OCT-92
Inorganic Analytes (mg/kg) (continued)				
Magnesium	160 J	130 J	167 J	90.9 J
Manganese	124	39.8 J	41.6 J	13.3
Mercury	0.12 J	--	--	0.08 J
Nickel	4.2 J	--	--	1.9 J
Potassium	185 J	--	299 J	--
Selenium	--	--	0.67 J	--
Silver	1 J	--	--	0.46 J
Sodium	182 J	--	--	212 J
Vanadium	104	18.8 J	20.8 J	22.7 J
Zinc	27.3	21.6	17.2	24.9
Cyanide	--	--	--	0.49 J

[1] The A in the sample locator indicates a duplicate sample.

Notes: ft bls = feet below land surface.
μg/kg = micrograms per kilogram.
J = estimated value.
-- = analyte is undetected in laboratory analysis.
PCB = polychlorinated biphenyl.
DDE = dichlorodiphenyldichloroethene.
DDD = dichlorodiphenyldichloroethane.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.

Table 5-13
Comparison of Analytes Detected in Site 10 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	*Range of* Reporting Limits	*Range of* Detected Concentrations[2]	*Background* Screening Concentration[3]	USEPA Region III RBCs Industrial[4]	FDEP Soil Cleanup Target Levels Residential/ Industrial[5]/Leachability
Volatile Organic Compounds (µg/kg)						
2-Butanone	1/3	11 to 12	51*	--	M	3,100,000/21,000,000/17,000
Carbon disulfide	3/3	11 to 12	2 to 5	--	M	200,000/1,400,000/5,600
Ethylbenzene	2/3	11 to 12	3 to 20*	--	M	1,100,000/8,400,000/600
Toluene	1/3	11 to 12	0.5*	--	M	380,000/2,600,000/500
Xylenes (total)	3/3	11 to 12	1 to 4*	--	M	5,900,000/40,000,000/200
Semivolatile Organic Compounds (µg/kg)						
2-Methylnaphthalene	2/3	370 to 420	95 to 175*	--	--	80,000/560,000/6,100
Acenaphthene	2/3	370 to 420	47 to 110	--	M	1,900,000/18,000,000/2,100
Dibenzofuran	1/3	370 to 420	82	--	820,000	280,000/5,000,000/15,000
Fluoranthene	1/3	370 to 420	58*	--	M	2,900,000/48,000,000/1,200,000
Fluorene	2/3	370 to 420	55 to 140	--	M	2,200,000/28,000,000/160,000
Naphthalene	2/3	370 to 420	160 to 250*	--	--	40,000/270,000/1,700
Phenanthrene	2/3	370 to 420	77 to 115*	--	--	2,000,000/30,000,000/250,000
Pyrene	1/3	370 to 420	128	--	M	2,200,000/37,000,000/880,000
Pesticides and PCBs (µg/kg)						
4,4'-DDD	2/3	3.7 to 16.5	1.4 to 10	--	24,000	4,600/18,000/4,000
4,4'-DDE	2/3	3.7 to 16.5	0.66 to 9.3	--	17,000	3,300/13,000/18,000
4,4'-DDT	1/3	3.7 to 16.5	3.9	--	17,000	3,300/13,000/11,000
Aldrin	1/3	1.9 to 8.65	3.9	--	340	70/300/500
Dieldrin	1/3	3.7 to 16.5	5	--	360	70/300/4

See notes at end of table.

Table 5-13 (Continued)
Comparison of Analytes Detected in Site 10 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations[2]	Background Screening Concentration[3]	USEPA Region III RBCs Industrial[4]	FDEP Soil Cleanup Target Levels Industrial[5]
Inorganic Analytes (mg/kg)						
Aluminum	3/3	40	12,000 to 12,400*	27,800	[7]200,000	72,000/--/SPLP
Antimony	1/3	2.8 to 12	7.9	4.4	82	26/240/5
Arsenic	3/3	2	1.7 to 3.7	6.2	[6]3.8	0.8/[9]4.62/29
Barium	3/3	40	13 to 28.2	15.8	[7]14,000	110/87,000/1,600
Beryllium	3/3	1	0.16 to 0.4	0.26	[6]410	120/800/63
Cadmium	1/3	0.67 to 1	0.91	0.92	1,000	75/1,300/8
Calcium	2/3	1,000	502 to 4,100	444	M	--/--/--
Chromium	3/3	2	11.2 to 207	22.8	[7]610	210/410/38
Cobalt	1/3	0.75 to 10	2.5	1.48	[7]12,000	4,700/110,000/SPLP
Copper	3/3	5	4.5 to 11.9	8.8	[7]8,200	110/76,000/SPLP
Cyanide	1/3	0.1 to 1	0.49	--	41,000	30/39,000/40
Iron	3/3	20	7,495 to 44,600*	18,100	[7]61,000	23,000/480,000/SPLP
Lead	3/3	1	13.85 to 82.4*	8.4	[8]400	400/920/SPLP
Magnesium	3/3	1,000	90.9 to 160	270	M	--/--/--
Manganese	3/3	3	13.3 to 124	42.6	[7]4,100	1,600/22,000/SPLP
Mercury	2/3	0.1	0.08 to 0.12	--	[7]61	3/26/2.1
Nickel	2/3	8	1.9 to 4.2	5	[7]4,100	110/28,000/130
Potassium	2/3	154 to 1,000	185 to 192.3*	180	M	--/--/--
Selenium	1/3	0.47 to 1	0.585*	0.3	10,000	390/10,000/5
Silver	2/3	0.435 to 2	0.46 to 1	1.12	10,000	390/9,100/17
Sodium	2/3	1,000	182 to 212	--	--	--/--/--
Vanadium	3/3	10	19.8 to 104*	45	[7]1,400	15/7,400/980
Zinc	3/3	4	19.4 to 27.3*	15.6	[7]61,000	23,000/560,000/6,000

See notes at end of table.

Table 5-13 (Continued)
Comparison of Analytes Detected in Site 10 Subsurface Soil Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The background screening value for organics is the mean detected concentration and will not be used for screening purposes. The background screening values for inorganics is twice the mean of detected concentrations and will be used for risk assessment screening.
[4] Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12). Values are presented in Appendix E of this RI/FS report.
[5] Contaminant Cleanup Target Levels, Chapter 62-777, Florida Administrative Code, May 1999.
[6] The values correspond to a human cancer risk level of 1 in 1,000,000.
[7] The calculated values correspond to a noncancer hazard quotient of 0.1.
[8] Source: Office of Solid Waste and Emergency Response memorandum dated July 14, 1994.
[9] Value is a FDEP approved site-specific cleanup goal for arsenic at landfill sites, NAS Whiting Field.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 10SS0201, 10SS0302, 10SS0302A, 10SS0503.
Background samples: BKB00101, BKB00102, BKB201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, BKB00702.
Background duplicate samples: BKB00401D and BKB00602D.

USEPA = U.S. Environmental Protection Agency.
RBC = risk-based concentration.
FDEP = Florida Department of Environmental Protection.
μg/kg = micrograms per kilogram.
* = average of a sample and its duplicate.
-- = no criteria available.
M = contaminant is not a health concern for this enclosure scenario.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyldichloroethane.
mg/kg = milligrams per kilogram.

in the background samples. All pesticides were below the regulatory screening values.

TAL Metals and (Total) Cyanide. Twenty-three inorganic analytes were detected in the subsurface soil samples from Site 10. Concentrations of 15 inorganic analytes (antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, copper, iron, lead, potassium, silver, vanadium, zinc, and cyanide) met or exceeded twice the background mean concentrations as shown in Table 5-12. Arsenic was detected at 37 mg/kg, which is equal to the Florida SCTL. Antimony and chromium were detected at concentrations that exceed the Florida SCTL for leachability.

5.7 GROUNDWATER ASSESSMENT

The groundwater assessment included the collection and analysis of groundwater samples from on-site monitoring wells during Phase I, IIA, and IIB.

5.7.1 Phase I Groundwater Samples

During the Phase I investigation, one groundwater sample was collected from WHF-9-CPT-1 at Site 9 and three groundwater samples were collected from two different locations at Site 10 (WHF-10-CPT-1 and WHF-10-CPT-2). Sampling locations are shown on Figure 3-3. For both Sites 9 and 10, the groundwater samples were analyzed for TCL VOCs and TAL metals at an off-site laboratory. For Phase I, groundwater samples were collected using the PCPT and BAT sampling technique, which is considered appropriate for preliminary screening but not appropriate for risk assessment or decision making relative to response actions. As a result, Phase IIA and IIB groundwater sampling was conducted at existing and newly installed monitoring wells using a low-flow method (i.e., bladder pumping) to support a risk assessment. A summary of the Phase I groundwater results is presented below.

Site 9. The groundwater sample at WHF-9-CPT-1 was collected at 100 feet bls. Acetone and carbon disulfide were detected in the groundwater sample; however, the detected concentrations were interpreted by HLA to be an artifact resulting from decontamination procedures because acetone and carbon disulfide were also detected at similar concentrations in the associated equipment blanks (ABB-ES, 1992b). Furthermore, acetone is widely recognized as a laboratory-derived contaminant according to USEPA, Contract Laboratory Program Functional Guidelines for Organic Data Review (USEPA, 1991b).

Nine inorganic analytes were detected in the groundwater sample. Results of the PCPT and BAT samples are summarized in the RI Phase I Technical Memorandum No. 5 (ABB-ES, 1992b).

Site 10. One groundwater sample was collected from 102 feet bls at WHF-10-CPT-1 (Figure 3-3). Samples were also collected at 102 feet bls and 152 feet bls at WHF-10-CPT-2 (Figure 3-3). Acetone was detected in two groundwater samples; however, the detected concentrations were interpreted by HLA to be an artifact resulting from decontamination procedures for the reasons stated above.

Six inorganic analytes were detected in the groundwater samples. Results of the PCPT and BAT samples are summarized in the RI Phase I Technical Memorandum No. 5 (ABB-ES, 1992b).

5.7.2 Phase II Groundwater Samples The Phase IIA and IIB groundwater samples were analyzed for TCL VOCs, SVOCs, pesticides, PCBs, and TAL inorganic analytes. For Phase IIA, groundwater samples were collected from three monitoring wells at Site 9 (WHF-9-1, WHF-9-2, and WHF-9-3) and two monitoring wells at Site 10 (WHF-10-1 and WHF-10-2). The locations of these wells are shown on Figure 3-3. For Phase IIB, the three existing monitoring wells at Site 9 and two existing wells at Site 10 were again sampled using low-flow sampling techniques. A summary of the analytical results for Phase IIA and IIB groundwater samples is presented below on an individual site basis.

5.7.2.1 Site 9 Table 5-14 presents the analytical results for groundwater samples collected at Site 9 during Phase IIA and IIB sampling events. Site 9 consists of one shallow well (WHF-9-3) and two intermediate depth wells (WHF-9-1 and WHF-9-2). The screened interval for the shallow well is 93 to 108 feet bls and 108 to 124 feet for the two intermediate wells.

Phase IIA. As shown in Table 5-14, three groundwater samples were collected from Site 9 monitoring wells. The analytical results are discussed below:

TCL VOCs. VOCs were not detected at concentrations above the IDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 9.

TCL SVOCs. SVOCs were not detected at concentrations above the IDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 9.

Pesticides and PCBs. No pesticide or PCB compounds were detected in groundwater samples collected from the shallow or intermediate monitoring wells at Site 9.

TAL Metals and Total Cyanide. Fifteen inorganic analytes were detected in the Phase IIA groundwater samples. Of the 15 metals detected, only 2 inorganic analytes (aluminum and iron) were detected at concentrations exceeding the Federal primary or secondary maximum contaminant levels (MCLs) and State GCTLs. The Federal MCLs and State GCTLs for aluminum and iron are 200 $\mu g/\ell$ and 300 $\mu g/\ell$, respectively.

Field Parameters. Representative measurements of the field parameters obtained during the purging of the monitoring wells are presented in Table 5-15. For Phase IIA, pH values for groundwater samples collected at Site 9 ranged from 7.99 to 11.80 standard units (SUs). As shown in Table 5-15, two of the three pH values during Phase IIA were above the upper range for the Florida secondary drinking water criteria of 8.5 SUs.

Temperature measurements ranged from 24.1 to 25.0 degrees Celsius (°C), and the specific conductance ranged from 33 to 1,300 micromhos per centimeter (μmhos/cm). Turbidity measurements for Phase IIA groundwater samples ranged from 12.7 to 612 NTUs, which were all above the Florida public water supply treatment technique criteria of 5 NTUs. For Phase IIA samples, groundwater samples were not filtered nor were low-flow sampling techniques used. Therefore, any inorganics detected in Phase IIA results may be attributable to dissolved or colloidal fractions for inorganics or from the leaching of inorganics from sediment in the sample when the sample bottle was preserved (i.e., acidified) to a pH of 2.0 SUs. As a result, analytical results for inorganic analytes may be biased high.

Table 5-14
Summary of Analytical Results Detected in Groundwater Samples, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sampling Event:	PHASE IIA			PHASE IIB				
Well Identifier:	WHF-9-1	WHF-9-2	WHF-9-3	WHF-9-1	WHF-9-2	WHF-9-3	WHF-9-3	WHF-9-3
Sample Identifier:	WHF9-1	WHF9-2	WHF9-3	09G00101	09G00201	09G00301	09G00301D (duplicate)	09G00301F (filtered)
Collect Date:	27-OCT-93	26-OCT-93	26-OCT-93	23-AUG-96	26-AUG-96	23-AUG-96	23-AUG-96	23-AUG-96
Volatile Organic Compounds (µg/ℓ)								
2-Butanone	--	--	--	--	--	2 J	--	NA
Semivolatile Organic Compounds (µg/ℓ)								
None detected	--	--	--	--	--	--	--	NA
Pesticides and PCBs (µg/ℓ)								
None detected	--	--	--	--	--	--	--	NA
Inorganic Analytes (µg/ℓ)								
Aluminum	3,190	231	6,840	104 J	3,420	407	372	289
Arsenic	3.2 J	--	3.1 J	--	3.6 J	2.6 J	2.8 J	--
Barium	60.5 J	35.5 J	35.1 J	66.1 J	9.9 J	27.1 J	25.8 J	25.4 J
Calcium	28,600	20,400	86,000	45,000	36,700	15,300	14,600	14,400
Chromium	10.3	7.6 J	67.8	--	12.3	4 J	2.4 J	2.6 J
Copper	5 J	--	5.2 J	--	--	--	--	--
Iron	4,250	246	816	--	--	173	148	11.3
Lead	3.2 J	--	--	--	--	--	--	--
Magnesium	433 J	199 J	197 J	60.6 J	--	158 J	160 J	151 J
Manganese	23.9	2.7 J	8.6 J	--	--	1.5 J	1.7 J	1.7 J
Nickel	--	9.3 J	--	--	--	--	--	--
Potassium	9,430	11,100	17,700	13,200	3,910 J	2,390 J	2,010 J	2,380 J
Sodium	3,520 J	3,920 J	3,850 J	4,570 J	1,420 J	2,070 J	1,950 J	2,030 J
Vanadium	32.7 J	2.8 J	24.6 J	--	21 J	16.4 J	14.3 J	14.1 J
Zinc	9.7 J	13.7 J	9.8 J	--	--	14.8 J	--	--

See notes at end of table.

Table 5-14 (Continued)
Summary of Analytical Results Detected in Groundwater Samples, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sampling Event:	PHASE IIA			PHASE IIB				
Well Identifier:	WHF-9-1	WHF-9-2	WHF-9-3	WHF-9-1	WHF-9-2	WHF-9-3	WHF-9-3	WHF-9-3
Sample Identifier:	WHF9-1	WHF9-2	WHF9-3	09G00101	09G00201	09G00301	09G00301D (duplicate)	09G00301F (filtered)
Collect Date:	27-OCT-93	26-OCT-93	26-OCT-93	23-AUG-96	26-AUG-96	23-AUG-96	23-AUG-96	23-AUG-96
Groundwater Quality (mg/ℓ)								
Alkalinity as $CaCO_3$	NA	NA	NA	138	94	43	NA	NA
Hardness as $CaCO_3$	NA	NA	NA	105	85	37	NA	NA
Sulfate	NA	NA	NA	0.49	9.4	0.76	NA	NA
Total dissolved solids	NA	NA	NA	136	106	50	NA	NA

Notes: μg/ℓ = micrograms per liter.
-- = analyte (if present) was not detected above instrument detection limit.
J = estimated value.
NA = not analyzed.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.

Table 5-15
Summary of Field Parameters, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (μmhos/cm)	Turbidity (NTU)
Phase IIA					
WHF-9-1	10-27-93	7.99	21.2	33	12.7
WHF-9-2	10-26-93	11.60	24.0	1,300	27.7
WHF-9-3	10-26-93	11.30	21.2	345	612
Phase IIB					
WHF-9-1	8-23-96	9.12	27.2	41	1
WHF-9-2	8-26-96	10.68	22.5	270	0.69
WHF-9-3	8-23-96	9.84	22.2	80	11.59

Notes: SU = standard unit.
°C = degrees Celsius.
μmhos/cm = micromhos per centimeter.
NTU = nephelometric turbidity unit.

Groundwater Quality. For Phase IIA, groundwater quality parameters such as alkalinity, hardness, sulfate, and TDS were not analyzed in the groundwater samples; however, these parameters were analyzed during Phase IIB and are discussed below.

Phase IIB. Three groundwater samples (plus one duplicate and one filtered sample) were collected during Phase IIB from Site 9 monitoring wells. The analytical results are summarized in Table 5-14. A comparison of analytes detected in Phase IIB groundwater samples to background screening values and to Federal primary MCLs and Florida GCTLs is shown in Table 5-16. Due to high turbidity readings during Phase IIA groundwater sampling, results from Phase IIA are not reported in Table 5-16. The analytical results for Phase IIB are discussed below:

TCL VOCs. One VOC (2-butanone) was detected in the groundwater sample collected from monitoring well WHF-9-3 with a concentration of 2 $\mu g/\ell$. As shown in Table 5-14, the concentration was qualified as estimated (J) because the analyte was detected below the CRDL. Furthermore, the VOC was not detected in the duplicate sample and may be a result of laboratory-derived contamination.

As shown in Table 5-16, Federal MCLs do not exist for 2-butanone; however, the State of Florida GCTL is 4,200 $\mu g/\ell$. Also, 2-butanone is recognized as a field or laboratory-derived contaminant according to USEPA, Contract Laboratory Program Functional Guidelines for Organic Data Review (USEPA, 1991b).

TCL SVOCs. SVOCs were not detected at concentrations that exceeded the CRDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 9.

Pesticides and PCBs. No pesticide or PCB compounds were detected in groundwater samples collected from the shallow or intermediate monitoring wells at Site 9.

Table 5-16
Comparison of Analytes Detected in Site 9 Phase IIB Groundwater Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Background Screening Values[3]	Federal MCLs[4]	Florida Groundwater Cleanup Target Levels	
						Concentration[5]	Basis[6]
Volatile Organic Compounds ($\mu g/\ell$)							
2-Butanone	1/3	10	3.5	--	NA	4,200	MC/ST
Inorganic Analytes ($\mu g/\ell$)							
Aluminum	3/3	NR	104 to 3,420	654	200	[8]200	S
Arsenic	2/3	0.5	2.7* to 3.6	ND	50	[8]50	P/C
Barium	3/3	NR	9.9 to 66.1	72.6	2,000	[8]2,000	P/ST
Calcium	3/3	NR	14,950* to 45,000	3,320	NA	NA	
Chromium	2/3	2	3.2* to 12.3	30	100	[8]100	P
Iron	1/3	5	160.5*	964	[7]300	[8]300	S
Magnesium	2/3	34	60.6 to 159*	2,430	NA	NA	
Manganese	1/3	1	1.6*	42.7	[7]50	[8]50	S/ST
Potassium	3/3	NR	2,200* to 13,200	1,530	NA	NA	
Sodium	3/3	NR	1,420 to 4,570	4,770	NA	[8]160,000	P
Vanadium	2/3	3.2	15.35* to 21	3.8	NA	49	MC/ST
Zinc	1/3	0.63	7.4*	200	[7]5,000	[8]5,000	S/ST

See notes at end of table.

Table 5-16 (Continued)
Comparison of Analytes Detected in Site 9 Phase II B Groundwater Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit (CRQL/CRDL) is used as a surrogate concentration for the nondetect.
[3] The background screening value for organic compounds is the arithmetic mean concentration of background samples and twice the average of detected concentrations for inorganic analytes in background samples.
[4] Federal MCLs are maximum permissible concentrations of contaminants in water that are delivered to a user by a public water system.
[5] Source: Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.
[6] The concentrations are based on the following criteria:
MC = FDEP groundwater guidance concentration based on minimum criteria
ST = systemic toxicant
C = carcinogen
P = FDEP groundwater standard
S = FDEP secondary groundwater standard
[7] Secondary MCL.
[8] As provided in Chapters 62-550 and 62-520, Florida Administrative Code.

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
-- = criteria not available.
NA = no applicable standard currently exists.
NR = not reported.
ND = not detected.
* = average of a sample and its duplicate.

TAL Metals and Total Cyanide. Twelve inorganic analytes were detected in the Phase IIB groundwater samples (Table 5-14). Of the 12 metals detected, only 1 inorganic analyte (aluminum) was detected at concentrations exceeding the Federal MCLs and State GCTLs. The Federal MCL and State GCTL for aluminum is 200 $\mu g/\ell$ (Table 5-16).

In comparison to background groundwater values (Table 5-16), only five analytes (aluminum, arsenic, calcium, potassium, and vanadium) exceeded their respective background screening values. Total cyanide was not detected in any of the groundwater samples.

Filtered Groundwater Samples. One filtered groundwater sample was collected from WHF-9-3 and analyzed for TAL inorganics (metals only) for comparison to the unfiltered sample from WHF-9-3 during Phase IIB. Table 5-14 contains a summary of metals detected in the filtered groundwater sample (sample identifier 09G00301F).

Comparison of the analytical results between the filtered sample and the corresponding unfiltered sample indicates that fewer analytes were detected in the filtered sample. For example, arsenic and zinc were 2.6 $\mu g/\ell$ and 14.8 $\mu g/\ell$, respectively, in the unfiltered sample and undetected in the filtered sample from WHF-9-3. In addition, analyte concentrations in the filtered sample are generally lower than the corresponding concentrations in the unfiltered sample. For example, iron resulted in the greatest change in concentration between the unfiltered sample (173 $\mu g/\ell$) and the filtered sample (11.3 $\mu g/\ell$) at WHF-9-3.

In summary, the number and concentration of inorganic analytes detected in groundwater samples collected during the 1996 sampling event (Phase IIB) are generally lower than the corresponding samples collected during the 1993 sampling event (Phase IIA). The low-flow sampling procedure used during Phase IIB resulted in less turbid groundwater samples as compared to the groundwater samples collected during Phase IIA (Table 5-15). The low-flow sampling method produces less turbid samples that are probably more representative of the surficial aquifer than those obtained with a bailer. It should be noted that chemicals detected in groundwater samples collected during the Phase IIA sampling event that were not detected in groundwater samples collected in Phase IIB were included in human health and ERAs.

Field Parameters. Representative measurements of the field parameters obtained during the purging of the monitoring wells are presented in Table 5-15. For Phase IIB, pH values for groundwater samples collected at Site 9 ranged from 9.12 to 10.68 SUs. All three pH values during Phase IIB were above the upper range for the Florida secondary drinking water criteria of 8.5 SUs.

Temperature measurements ranged from 22.2 to 27.2 °C and the specific conductance ranged from 41 to 270 μmhos/cm. Turbidity measurements for Phase IIB groundwater samples using the low-flow sampling method ranged from 0.69 to 11.59 NTUs; however, only the sample from shallow well WHF-9-3 produced turbidity measurements above the Florida public water supply treatment technique criteria of 5 NTUs. Furthermore, WHF-9-3 was used to collect a filtered water sample to eliminate turbidity.

Groundwater Quality. As shown in Table 5-14, groundwater quality parameters were measured during Phase IIB groundwater sampling. The alkalinity for groundwater samples ranged from 43 mg/ℓ calcium carbonate ($CaCO_3$) to 138 mg/ℓ $CaCO_3$; water hardness ranged from 37 mg/ℓ $CaCO_3$ to 105 mg/ℓ $CaCO_3$; sulfate concentration ranged from 0.49 mg/ℓ to 9.4 mg/ℓ; and TDS ranged from 50 mg/ℓ to 136 mg/ℓ.

5.7.2.2 **Site 10** Table 5-17 presents the analytical results for groundwater samples collected at Site 10 during Phase IIA and IIB sampling events. Site 10 consists of one shallow well (WHF-10-2) and one intermediate depth well (WHF-10-1). The screened interval for the shallow well is 98 to 113 feet bls and 108 to 118 feet for the intermediate well. Below is a discussion of the analytical results for the Phase IIA and IIB sampling events.

Phase IIA. As shown in Table 5-17, two groundwater samples were collected from Site 10 monitoring wells during the Phase IIA sampling event. The analytical results are discussed below:

TCL VOCs. VOCs were not detected at concentrations above the IDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 10.

TCL SVOCs. SVOCs were not detected at concentrations above the IDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 10.

Pesticides and PCBs. No pesticide or PCB compounds were detected in groundwater samples collected from the shallow or intermediate monitoring wells at Site 10.

TAL Metals and Total Cyanide. Twelve inorganic analytes were detected in the Phase IIA groundwater samples. Of the 12 metals detected, only 2 inorganic analytes (aluminum and iron) were detected at concentrations exceeding the Federal MCL and State GCTLs. The Federal MCLs and State GCTLs for aluminum and iron are 200 μg/ℓ and 300 μg/ℓ, respectively. Both analytes exceeding the screening criteria were detected from the shallow well (WHF-10-2). Total cyanide was not detected in any of the groundwater samples.

Field Parameters. Representative measurements of the field parameters obtained during the purging of the monitoring wells are presented in Table 5-18. For Phase IIA, pH values for groundwater samples collected at Site 10 ranged from 5.07 to 5.25 SUs. Both pH values were below the lower range for the Florida secondary drinking water criteria of 6.5 SUs.

Temperature measurements were 22.0 °C, and the specific conductance ranged from 15 to 19 μmhos/cm. Turbidity measurements for the Phase IIA groundwater samples were 0.96 NTUs and 41 NTUs. The turbidity from WHF-10-2 was above the Florida public water supply treatment technique criteria of 5 NTUs. For Phase IIA samples, groundwater samples were not filtered nor were low-flow sampling techniques used. Therefore, inorganics detected in Phase IIA results may be attributable to dissolved or colloidal fractions for inorganics or from the leaching of inorganics from sediment in the sample when the sample bottle was preserved (i.e., acidified) to a pH of 2.0 SUs. As a result, analytical results for inorganic analytes may be biased high.

Groundwater Quality. For Phase IIA, groundwater quality parameters such as alkalinity, hardness, sulfate, and TDS were not analyzed in the groundwater samples; however, some of these parameters were analyzed during Phase IIB and are discussed below.

Table 5-17
Summary of Analytical Results Detected in Groundwater Samples, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sampling Event:	PHASE IIA		PHASE IIB	
Well Identifier:	WHF-10-1	WHF-10-2	WHF-10-1	WHF-10-2
Sample Identifier:	WHF10-1	WHF10-1	10G00101	10G00201
Collect Date:	27-OCT-93	27-OCT-93	26-AUG-96	26-AUG-96
Volatile Organic Compounds (μg/ℓ)				
None detected	--	--	--	--
Semivolatile Organic Compounds (μg/ℓ)				
bis(2-Ethylhexyl) phthalate	--	--	2 J	--
Pesticides and PCBs (μg/ℓ)				
None detected	--	--	--	--
Inorganic Analytes (μg/ℓ)				
Aluminum	29.5 J	674	--	--
Barium	10.3 J	8.6 J	16.8 J	11 J
Calcium	657 J	570 J	1,140 J	--
Chromium	--	4.4 J	--	--
Iron	31.3 J	722	--	113
Lead	1.5 J	1.2 J	--	--
Magnesium	254 J	337 J	301 J	355 J
Manganese	1.6 J	12.6 J	--	3.5 J
Potassium	2,200 J	1,110 J	2690	--
Sodium	1,770 J	2,590 J	2,090 J	2,360 J
Vanadium	--	2.5 J	--	--
Zinc	18.4 J	22.4	28.6	--
Groundwater Quality (mg/ℓ)				
Sulfate	NA	NA	0.25	0.4
Total dissolved solids	NA	NA	14	10

Notes: μg/ℓ = micrograms per liter.
-- = analyte (if present) was not detected above the instrument detection limit.
J = estimated value.
PCB = polychlorinated biphenyl.
mg/ℓ = milligrams per liter.
NA = not analyzed.

Table 5-18
Summary of Field Parameters, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Monitoring Well Designation	Date Sampled	pH (SU)	Temperature (°C)	Specific Conductance (μmhos/cm)	Turbidity (NTU)
Phase IIA					
WHF-10-1	10-27-93	5.07	22.0	19	0.96
WHF-10-2	10-27-93	5.25	22.0	15	41
Phase IIB					
WHF-10-1	8-26-96	6.12	23.7	23	0.44
WHF-10-2	8-26-96	4.75	22.0	25	8.8

Notes: SU = standard unit.
°C = degrees Celsius.
μmhos/cm = micromhos per centimeter.
NTU = nephelometric turbidity unit.

Phase IIB. Two groundwater samples were collected during Phase IIB from Site 10 monitoring wells. The analytical results are summarized in Table 5-17. A comparison of analytes detected in Phase IIB groundwater samples to background screening values, Federal primary MCLs, and Florida GCTLs is shown in Table 5-19. The analytical results for Phase IIB are discussed below:

TCL VOCs. VOCs were not detected at concentrations that exceeded the CRDL in groundwater samples collected from the shallow or intermediate monitoring wells at Site 10.

TCL SVOCs. One SVOC [bis(2-ethylhexyl)phthalate] was detected in the groundwater sample collected from monitoring well WHF-10-1 with a concentration of 2 $\mu g/\ell$. As shown in Table 5-17, the concentration was qualified as estimated (J) and is likely the result of a sampling artifact. As shown in Table 5-19, the SVOC detected was below both the Federal MCL and State GCTL for bis(2-ethylhexyl)p-hthalate.

Pesticides and PCBs. No pesticide or PCB compounds were detected in groundwater samples collected from the shallow or intermediate monitoring wells at Site 10.

TAL Metals and Total Cyanide. Eight inorganic analytes were detected in the Phase IIB groundwater samples (Table 5-17). None of the metals detected exceeded either the Federal MCLs or State GCTLs. The Federal MCLs and State GCTLs for analytes detected are shown in Table 5-16.

In comparison to background groundwater values (Table 5-16), only one analyte (potassium) exceeded its background screening value of 2,690 $\mu g/\ell$. Total cyanide was not detected in any of the groundwater samples.

In summary, the number and concentration of inorganic analytes detected in groundwater samples collected during the 1996 sampling event (Phase IIB) are generally lower than the corresponding samples collected during the 1993 sampling event (Phase IIA). The low-flow sampling procedure used during Phase IIB resulted

Table 5-19
Comparison of Analytes Detected in Site 10 Phase IIB Groundwater Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Background Screening Concentration[3]	Federal MCLs[4]	Florida Groundwater Cleanup Target Levels	
						Concentration[5]	Basis[6]
Semivolatile Organic Compounds ($\mu g/\ell$)							
bis(2-Ethylhexyl)phthalate	1/2	10	2	--	5	[8]6	P/C
Inorganic Analytes ($\mu g/\ell$)							
Barium	2/2	40	11 to 16.8	72.6	2,000	[8]2,000	P/ST
Calcium	1/2	446	1,140	3,320	NA	NA	
Iron	1/2	5	113	964	[7]300	[8]300	S
Magnesium	2/2	1,000	301 to 355	2430	NA	NA	
Manganese	1/2	1	3.5	42.8	[7]50	[8]50	S/ST
Potassium	1/2	417	2,690	1,530	NA	NA	
Sodium	2/2	1,000	2,090 to 2,360	4770	NA	[8]160,000	P
Zinc	1/2	3.7	28.6	200	[7]5,000	[8]5,000	S/ST

See notes at end of table.

Table 5-19 (Continued)
Comparison of Analytes Detected in Site 10 Groundwater Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit (CRQL/CRDL) is used as a surrogate concentration for the nondetect.
[3] The background screening value for organic compounds is the arithmetic mean concentration of background samples and twice the average of detected concentrations for inorganic analytes in background samples.
[4] Federal MCLs are maximum permissible concentrations of contaminants in water that are delivered to a user by a public water system.
[5] *Source: Brownfields Cleanup Criteria Rule*, Chapter 62-785, Florida Administrative Code, July 6, 1998.
[6] The concentrations are based on the following criteria:
C = carcinogen
P = FDEP groundwater standard
S = FDEP secondary groundwater standard
ST = systemic toxicant
[7] Secondary MCL.
[8] As provided in Chapters 62-550 and 62-520, Florida Administrative Code.

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
-- = criteria not available.
NA = no applicable standard currently exists.

in less turbid groundwater samples as compared to the groundwater samples collected during Phase IIA. The low-flow sampling method produces less turbid samples that are more representative of the surficial aquifer than those obtained with a bailer. It should be noted that chemicals detected in groundwater samples collected during the Phase IIA sampling event that were not detected in Phase IIB were included in human health and ERAs.

Field Parameters. Representative measurements of the field parameters obtained during the purging of the monitoring wells are presented in Table 5-18. For Phase IIB, pH values for groundwater samples collected at Site 10 ranged from 4.75 to 6.12 SUs. Both pH values were below the lower range for the Florida secondary drinking water criteria of 6.5 SUs.

Temperature measurements ranged from 22.0 to 23.7 °C and the specific conductance ranged from 23 to 25 μmhos/cm. Turbidity measurements for Phase IIB groundwater samples using the low-flow sampling method ranged from 0.44 to 8.8 NTUs. The 8.8 NTU turbidity measurement from the shallow well (WHF-10-2) was the only location that produced a turbidity measurement above the Florida public water supply treatment technique criteria of 5 NTUs.

Groundwater Quality. As shown in Table 5-17, certain groundwater quality parameters were measured during Phase IIB groundwater sampling. The sulfate concentration ranged from 0.25 mg/ℓ to 0.4 mg/ℓ and TDS ranged from 10 mg/ℓ to 14 mg/ℓ.

5.8 SURFACE WATER ASSESSMENT. The surface water assessment at Site 9 was conducted to assess the extent of surface water contamination from storm water runoff or contaminated surface soil (if present). One surface water sample (and a duplicate sample) was collected from the standing water/ponded area at Site 9 in January 1996 (Phase IIB). The standing water/ponded area occurs during heavy rain periods and is shown on Figure 3-3. Surface water is not present at Site 10; therefore, no surface water samples were collected.

A summary of the analytes detected in the Site 9 surface water samples is shown in Table 5-20. A comparison of analytes detected in the surface water samples to benchmark concentrations is shown in Table 5-21. A summary of the analytical results is discussed below:

Total Petroleum Hydrocarbons. TPH was not detected at concentrations that exceeded the IDL in the surface water sample or duplicate sample collected from Site 9.

As shown in Table 5-21, the detected concentration of toluene was below the Clean Water Act (CWA) Ambient Water Quality Criteria of 14,300 μg/ℓ for water and fish consumption and 17,500 μg/ℓ for freshwater acute toxicity. Also shown in Table 5-21, Florida surface water quality standards for Class III freshwater has not been established for toluene; therefore, no comparison is made.

TCL VOCs. One VOC (toluene) was detected in the duplicate sample (09W00101D) at a concentration of 2 μg/ℓ. The concentration was qualified as estimated (J) because the analyte was detected below the CRDL. Since the VOC was not detected in the surface water sample (09W00101), the VOC may be a sampling or laboratory-derived artifact.

Table 5-20
Summary of Analytical Results Detected in Surface Water Sample, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Sample Identifier:	09W00101	09W00101D
Collect Date:	05-JAN-96	05-JAN-96
Total Petroleum Hydrocarbons (µg/ℓ)		
None detected	--	--
Volatile Organic Compounds (µg/ℓ)		
Toluene	--	1 J
Semivolatile Organic Compounds (µg/ℓ)		
None detected	--	--
Pesticides and PCBs (µg/ℓ)		
None detected	--	--
Inorganic Analytes (µg/ℓ)		
Aluminum	123 J	129 J
Arsenic	0.6 J	--
Calcium	760 J	726 J
Iron	118	105
Magnesium	234 J	236 J
Manganese	12.2 J	12 J
Potassium	313 J	298 J
Sodium	904 J	893 J

Notes: D = duplicate sample.
µg/ℓ = microgram per liter.
-- = analyte (if present) was not detected above the instrument detection limit.
J = estimated value.

Table 5-21
Comparison of Analytes Detected in Site 9 Surface Water Samples to Background Screening Values and Benchmark Concentrations

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	CWA Ambient Water Quality Criteria[3] Water and Fish Consumption/ Freshwater Acute Toxicity	Florida Surface Water Quality Standards[4] Class III Freshwater
Volatile Organic Compounds (μg/ℓ)					
Toluene	1/1	10	3*	14,300/17,500	--
Inorganic Analytes (μg/ℓ)					
Aluminum	1/1	200	126*	pH dependent[5]	--
Arsenic	1/1	10	2.8*	0.0022/--	50
Calcium	1/1	5,000	743*	--	--
Iron	1/1	100	111.5*	300/[6]1,000	1,000
Magnesium	1/1	5,000	235*	--	--
Manganese	1/1	15	12.1*	50/--	--
Potassium	1/1	5,000	305.5*	--	--
Sodium	1/1	5,000	898.5*	--	--

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] Clean Water Act (CWA), Federal Ambient Water Quality Criteria, November 1995.
[4] Florida Surface Water Quality Standards, FAC 62-302, 1995.
[5] Criteria are pH dependent (see Federal Register 53FR33178).
[6] Number is for chronic aquatic toxicity for iron.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 09W00101 Duplicate sample: 09W00101D

CWA = Clean Water Act.
μg/ℓ = micrograms per liter.
* = average of a sample and its duplicate.
-- = no criteria available.

TCL SVOCs. SVOCs were not detected at concentrations that exceeded the CRDL in the surface water sample collected from Site 9.

Pesticides and PCBs. No pesticide or PCB compounds were detected in the surface water sample collected from Site 9.

TAL Metals and Total Cyanide. Eight inorganic analytes were detected in the surface water sample (Table 5-20). All metals detected (except iron) were qualified as estimated (J) because the analyte was detected below the CRDL. Of the eight metals detected, only one inorganic analyte (arsenic) exceeded the CWA Ambient Water Quality Criteria for water and fish consumption of 0.0022 $\mu g/\ell$ as shown in Table 5-21. None of the metals exceeded established criteria for freshwater acute toxicity or Florida Class III freshwater standards (Table 5-21). Total cyanide was not detected in the surface water sample or duplicate sample.

6.0 HUMAN HEALTH RISK ASSESSMENT

A HHRA has been conducted as part of the RI/FS for Site 9 and Site 10 at NAS Whiting Field. The purpose of the HHRA is to characterize the risks associated with the hypothetical exposures to site-related chemicals. This HHRA is conducted in accordance with the following guidance documents:

- USEPA's Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A) (USEPA, 1989a),
- Guidance for Data Useability in Risk Assessment (Part A), Final (USEPA, 1992a), and
- Region IV Risk Assessment Guidance (USEPA, 1995a).

Additionally, the HHRA will consider Florida Department of Environmental Protection (FDEP) cleanup criterion:

- Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.

The methodology for the HHRA is described in Chapter 2.0 of the GIR (HLA, 1998). The HHRA methodology presented in the GIR (HLA, 1998) consists of the following steps:

- data evaluation,
- selection of chemicals of potential concern,
- exposure assessment,
- toxicity assessment, and
- risk characterization.

The HHRA was prepared prior to the promulgation of the Florida SCTLs and GCTLs, Chapter 62-785, FAC. A comparison of the cleanup target levels and the Sites 9 and 10 soil detections is presented in Chapter 5.0. No additional human health chemicals of potential concern were identified in the HHRA based on the Florida SCTLs and GCTLs.

Site 9, Waste Fuel Disposal Pit, is located along the eastern facility boundary near the South Air Field at NAS Whiting Field. Site 10, Southeast Open Disposal Area is contiguous to Site 9. The location, physical description, and history associated with Site 9 and Site 10 are described in Chapter 1.0 of this report. During the RI, surface soil, subsurface soil, groundwater, and surface water were collected from Site 9 and Site 10. Sampling locations and the sampling rationale are presented in Chapter 3.0 of this report.

6.1 DATA EVALUATION. The data evaluation involves numerous activities, including sorting data by medium; evaluating quantitation limits; and evaluating quality of data with respect to qualifiers.

The data for Sites 9 and 10 were divided into the following categories: surface soil, subsurface soil (Site 10 only), groundwater, surface water (Site 9 only), and background for each media.

Sample quantitation limits (SQLs) are compared to USEPA Region III RBCs (USEPA, 1998) and Florida Cleanup Target Levels (FDEP, 1998). Surface and subsurface soil SQLs were compared to Region III RBCs (USEPA, 1998) and Florida SCTLs (FDEP, 1998) for residential, industrial, and leachability (if necessary, based on groundwater contamination) scenarios. Groundwater SQLs were compared to Florida GCTLs (FDEP, 1998) and Region III tap water RBCs (USEPA, 1998). Surface water SQLs were compared to Region IV Water Quality standards (USEPA, 1995b) and Florida water quality standards (FDEP, 1996b). Analyte-specific SQLs that are above RBCs and Florida screening values are identified and discussed in the uncertainty analysis.

The quality of the data was evaluated with respect to the data qualifiers. Only data of sufficient quality were retained for evaluation in this HHRA. The HHRA considers data with "J", "U", and "UJ" qualifiers as well as data with no qualifier.

6.2 SELECTION OF HUMAN HEALTH CHEMICALS OF POTENTIAL CONCERN. The human health chemicals of potential concern (HHCPCs) were selected per the methodology described in Section 2.5 of the GIR (HLA, 1998). This HHCPC methodology considers (1) frequency of detection, (2) consistency with background conditions, (3) a comparison to regulatory and risk-based screening values, and (4) a comparison to essential nutrient levels.

In selecting HHCPCs, USEPA Region IV criteria were used (USEPA, 1995a). For each medium, the following criteria were employed to exclude detected analytes from the list of HHCPCs. Each criterion by itself is justification for excluding the analyte:

Less than 5 Percent Frequency of Detection. If an analyte has a frequency of detection (number of samples in which the analyte is detected divided by the number of samples analyzed for that analyte) less than 5 percent (USEPA, 1995a) and is not selected as an HHCPC in another medium, it is not selected as an HHCPC. This criterion is not used if there are less than 20 environmental samples for a specific medium and therefore does not apply in this HHRA.

Less than Background Screening Concentrations. If the maximum detected concentration of an analyte is less than twice the arithmetic mean of the background concentration (inorganics only), the analyte is not selected as an HHCPC (USEPA, 1995a). The background screening values for surface soil, subsurface soil, groundwater, and surface water are identified below.

- A representative surface soil background data set consisting of Troup loamy sand is used for background screening of Sites 9 and 10 surface soil samples. Sample locations are identified on Figure 3-10 and are discussed in Subsection 3.3.1 of the GIR (HLA, 1998). The background surface soil data used for screening surface soils at Site 9 and Site 10 are presented in Table 3-8 of the GIR (HLA, 1998). Table 3-9 in the GIR (HLA, 1998) presents the summary statistics and background screening value used in the Site 9 and Site 10 HHRA surface soil evaluation.
- Background subsurface soil sample locations are identified on Figure 3-11 and discussed in Subsection 3.3.2 (HLA, 1998). Tables 3-15 and 3-17

present the background screening data, and Table 3-18 presents summary statistics for screening subsurface soil at Site 10.

- Background groundwater sample locations are identified on Figure 3-12 and discussed in Subsection 3.3.3 of the GIR (HLA, 1998). Tables 3-21 through 3-23 of the GIR (HLA, 1998) present background screening data for groundwater. Table 3-24 of the GIR (HLA, 1998) presents the summary statistics used for screening the groundwater at Site 9 and Site 10.

- Background surface water data are not available for Site 9. The surface water at Site 9 is an isolated water body created as a result of excavation activities. Neither Coldwater Creek, Clear Creek, or ponds in the area are similar to the ephemeral pond at Site 9.

Less than Risk-Based Screening Concentrations, Standards, and Guidelines. If the maximum detected concentration of the analyte in a medium is less than its corresponding adjusted USEPA Region III RBC (USEPA, 1998), and less than Federal and Florida standards and guidelines, the analyte is not selected as an HHCPC (USEPA, 1995a). The target hazard quotient (HQ) in the USEPA Region III RBC table is 1 and the target cancer risk is 1×10^{-6}. All RBCs based on noncarcinogenic effects are adjusted for a target HQ of 0.1 per Region IV guidance (USEPA, 1995a).

The residential soil RBCs are used for surface soil. The industrial soil RBCs are used for subsurface soil. No RBC is available for lead in soil due to a lack of toxicity data. Based on USEPA recommendation, a screening level of 400 mg/kg for lead under residential land use is used as the RBC for lead in soil (USEPA, 1994c). No RBC is available for TPH; therefore, the FDEP Risk-Based Target Cleanup Level (FDEP, 1998) is used for screening. The maximum detected concentrations of analytes in surface soil are also compared to residential Florida SCTLs. The maximum detected concentration of any organic analyte in surface soil that was also detected in groundwater (above a standard or guideline) is compared to the Florida SCTL for leaching for that analyte.

Tap water RBCs (USEPA, 1998), Federal MCLs (USEPA, 1996a) and Florida GCTLs (FDEP, 1998) are used for groundwater.

For surface water, Florida Surface Water Quality Standards (freshwater) (FDEP, 1996b), Region IV Water Quality Standards for human health consumption of water and organisms (USEPA, 1995b), and tap water RBC (USEPA, 1998) are used.

Less than Essential Nutrient Screening Values. If the maximum detected concentration of an essential nutrient in a medium is below a toxic level and consistent with or only slightly above its background concentration, the essential nutrient is not selected as an HHCPC. The derivation of essential nutrient screening values is presented in Appendix C-1 of the GIR.

HHCPCs were not screened using the iron essential nutrient value; the RBC was used instead. However, if iron is determined to be a risk driver, a comparison of the risk concentrations against the essential nutrient level for iron will be presented in the uncertainty section for that medium.

If the analyte meets any of the above criteria, is not a member of the same chemical class as other HHCPCs in the medium, and is not a breakdown product of other HHCPCs in the medium, then the analyte is not selected as a CPC. In situations where multiple screening values are available, a chemical is excluded only if its maximum screening concentration is less than all of the corresponding screening values. Appendix C presents the RBCs, regulatory guidance values, and applicable or relevant and appropriate requirements (ARARs) that are used in HHCPC selection. After applying these criteria with professional judgment, HHCPCs are identified for each medium. HHCPC selection for each medium is presented below in Paragraphs 5.2.2.1 through 5.2.2.3.

6.2.1 Surface Soil

6.2.1.1 Site 9 Surface Soil Five samples (09S00101 to 09S00501 and a duplicate, 09S00301D) were collected from Site 9 during Phase II of the RI (Figure 3-1 and Table 3-1). VOCs, SVOCs, pesticides, PCBs, and inorganic data from all of these samples are evaluated in this HHRA. Table 6-1 identifies six inorganic analytes (aluminum, antimony, arsenic, chromium, iron, and vanadium) selected as HHCPCs for surface soil at Site 9.

6.2.1.2 Site 10 Surface Soil Eleven surface soil samples (10-SL-01 through 10-SL-05, 10S00101, 10S00201 [all but bis(2-ethylhexyl)phthalate], 10S00201DL [only bis(2-ethylhexyl)phthalate], 10S00301 [all but semivolatile], 10S00301R [only semivolatile], 10S00401, 10S00501, 10S00601; and two duplicate samples; 10S00101D, and 10S00201D) were collected from Site 10 (Figure 3-3 and Table 3-2). VOCs, SVOCs, pesticides, PCBs, and inorganic data from all of these samples are evaluated in this HHRA. TPH was only analyzed in samples 10S00201, 10S00301, 10S00501, and 10S00201D. Table 6-2 identifies that seven polyaromatic hydrocarbons (PAHs), (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k) fluoranthene, dibenzo(a,h)anthracene, and chrysene, indeno(1,2,3-cd)pyrene), Aroclor-1254, four inorganic analytes (aluminum, arsenic, iron, and vanadium), and TPH were selected as HHCPCs for surface soil at Site 10.

6.2.2 Subsurface Soil

6.2.2.1 Site 10 Subsurface Soil Three subsurface soil samples (10SS0201, 10SS0302, 10SS0503) and a duplicate sample (10SS302A) were collected from Site 10 (Figure 3-2). VOCs, SVOCs, pesticides, PCBs, and inorganic data from these samples are evaluated in this HHRA. Table 6-3 presents the HHCPCs selection for subsurface soil at Site 10. No analytes were selected as HHCPCs in the subsurface soil.

6.2.3 Groundwater

6.2.3.1 Site 9 Groundwater Three groundwater samples (09G00101 through 09G00301 and a duplicate sample 09G00301D) were collected from Site 9 (Figure 3-3 and Table 3-1). VOCs, SVOCs, pesticides, PCBs, and inorganic data from these samples are evaluated in this HHRA. The 1996 sampling event, which collected groundwater using the low-flow method described in Section 3.5, was evaluated in this HHRA. Table 6-4 identifies two inorganics (aluminum and arsenic) selected as HHCPCs for groundwater in Site 9.

Table 6-1
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations	Average of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Volatile Organic Compounds (μg/kg)								
1,2,4-Trichlorobenzene	1/5	370 to 470	110	110	NA	78,000	No	S
1,4-Dichlorobenzene	1/5	370 to 470	120	120	NA	5,600	No	S
Inorganic Analytes (mg/kg)								
Aluminum	4/5	40	17,500 to 29,300	25,438	15,848	7,800	Yes	
Antimony	1/5	12	8.3	8.3	8	3.1	Yes	
Arsenic	5/5	NA	2.8 to 10.1	7	3.2	0.43	Yes	
Barium	4/5	40	5.5 to 15.3	10	23.2	150	No	B, S
Beryllium	4/5	1	0.08 to 0.17	0.13	0.36	16	No	B,S
Calcium	1/5	1,000	442	442	396	1,000,000	No	S
Chromium	4/5	2	14.9 to 46.2	29.5	11	23	Yes	
Cobalt	1/5	10	0.535	0.54	3	470	No	B, S
Copper	4/5	5	4.5 to 7.5	6.1	9.4	105	No	B, S
Iron	4/5	20	12,300 to 29,800	22,038	8,832	2,300	Yes	
Lead	5/5	0.6	3.1 to 12.3	7.1	11.4	500	No	S
Magnesium	4/5	1,000	73.3 to 185	127	268	460,468	No	B, S
Manganese	4/5	3	10.1 to 40.55	23.5	392	160	No	B, S
Mercury	4/5	0.1	0.01 to 0.03	0.02	0.12	2.3	No	B, S
Nickel	3/5	8	2.9 to 5.05	4	7.2	105	No	B, S
Potassium	1/5	1,000	356	356	177	1,000,000	No	S
Vanadium	4/5	10	32.2 to 76.7	57	21.8	15	Yes	
Zinc	3/5	4	3.8 to 10.35	7	15.4	2,300	No	B, S

See notes at end of table.

Table 6-1 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for industrial soil exposure per January 1993 guidance ("Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," EPA/903/R-93-001) or the Florida Soil Cleanup Target Levels (Chapter 62-785, FAC) (FDEP, 1998) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[5] Analyte was included or excluded from the risk assessment for the following reasons:

B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 09S00101 through 09S00501
Duplicate sample: 09S00301D
Background samples: BKG-SL-02, BK-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and, BKS00501.
Background duplicate sample: BKS00201D

HHCPC = human health chemical of potential concern.
NA = not applicable.
μg/kg = micrograms per kilogram.
mg/kg = milligrams per kilogram.

Table 6-2
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (μg/kg)								
2-Hexanone	1/11	11 to 12	4.8 *	4.8	NA	310,000	No	S
Xylenes (total)	1/11	5 to 12	1	1	NA	13,000,000	No	S
Semivolatile Organic Compounds (μg/kg)								
Acenaphthene	2/11	350 to 1,600	110 to 115 *	113	NA	470,000	No	S
Anthracene	3/11	350 to 1,600	120 * to 228 *	183	NA	2,300,000	No	S
Benzo(a)anthracene	8/11	350 to 1,600	42 to 1,400	380	NA	870	Yes	
Benzo(a)pyrene	6/11	350 to 1,600	45 to 2,500	627	NA	87	Yes	
Benzo(b)fluoranthene	8/11	350 to 1,600	62 to 2,500	550	NA	870	Yes	
Benzo(g,h,i)perylene	2/11	350 to 1,600	260 * to 3,800	2,030	NA	8,700	No	S
Benzo(k)fluoranthene	7/11	350 to 1,600	62 to 2,300	532	NA	8,700	Yes	C
Butylbenzylphthalate	4/11	350 to 1,600	40 to 120 *	73.6	NA	220,000	No	S
Carbazole	3/6	365 to 1,600	140 * to 160	147	NA	32,000	No	S
Chrysene	9/11	350 to 1,600	40 to 1,600	395	NA	87,000	Yes	C
Dibenzo(a,h)anthracene	2/11	185 to 380	180 * to 1,000	589	NA	87	Yes	
Dibenzofuran	1/11	350 to 1,600	52	52	NA	31,000	No	S
Diethylphthalate	1/11	350 to 1,600	96	96	NA	640,000	No	S
Fluoranthene	8/11	350 to 1,600	59 to 1,500 *	551	NA	310,000	No	S
Fluorene	1/11	350 to 1,600	120	120	NA	310,000	No	S
Indeno(1,2,3-cd)pyrene	4/11	350 to 1,600	57 * to 3,200	919	NA	870	Yes	
Phenanthrene	6/11	350 to 1,600	36 to 740 *	301	NA	230,000	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Semivolatile Organic Compounds (μg/kg) (continued)								
Pyrene	9/11	350 to 1,600	45 to 1,800	503	NA	230,000	No	S
bis(2-Ethylhexyl)phthalate	7/11	350 to 1,600	57 to 1,720	350	NA	46,000	No	S
Pesticides and PCBs (μg/kg)								
4,4'-DDD	1/11	3.6 to 170	4.4	4.4	NA	2,700	No	S
4,4'-DDE	1/11	3.6 to 170	37	37	NA	1,900	No	S
4,4'-DDT	7/11	3.8 to 170	2.1 to 35	17	NA	1,900	No	S
Aroclor-1254	5/11	36 to 1,700	51 to 370 *	229	NA	320	Yes	
Aroclor-1260	2/11	36 to 1,700	49 to 60	54.5	NA	320	No	S
Dieldrin	1/11	3.6 to 170	19	19	NA	40	No	S
Heptachlor	1/11	1.9 to 86	5.2	5.2	NA	10	No	S
Heptachlor epoxide	1/11	1.9 to 86	2.4	2.4	NA	70	No	S
alpha-Chlordane	2/11	1.9 to 860	1.1 to 5.2	3.2	NA	490	No	S
gamma-Chlordane	1/11	1.9 to 860	6.4	6.4	NA	490	No	S
Inorganic Analytes (mg/kg)								
Aluminum	11/11	NA	7,430 * to 37,000	16,673	15,848	7,800	Yes	
Arsenic	11/11	NA	2.6 * to 8.8	4.8	3.2	0.43	Yes	
Barium	11/11	NA	7.5 to 191 *	30.9	23.2	105	No	S
Beryllium	9/11	0.09 to 1	0.08 * to 0.32 *	0.17	0.36	16	No	B
Cadmium	7/11	0.09 to 1	0.5 to 2.4	1.3	0.58	3.9	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]*	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Inorganic Analytes (mg/kg) (continued)								
Calcium	11/11	NA	157 to 20,500 *	2,629	396	1,000,000	No	S
Chromium	11/11	NA	10.1 to 31.9	19.3	11	23	Yes	
Cobalt	10/11	10	0.81 * to 2.4	1.5	3	470	No	B, S
Copper	10/11	5	5.2 to 24.2	11.3	9.4	105	No	S
Cyanide	5/11	0.24 to 0.5	0.11 to 0.17 *	0.14	0.28	160	No	B, S
Iron	11/11	NA	6,650 * to 23,800	13,130	8,832	2,300	Yes	
Lead	11/11	NA	8.6 to 47.8	27.2	11.4	400	No	S
Magnesium	11/11	NA	77.7 to 5,760 *	676	268	460,468	No	S
Manganese	11/11	NA	13.1 to 389	84.4	392	160	No	B
Mercury	5/11	0.08 to 0.14	0.01 to 0.2	0.08	0.12	2.3	No	S
Nickel	7/11	2.3 to 8	3 * to 7	4.9	7.2	105	No	S
Potassium	5/11	129 to 1,000	70.5 to 360 *	225	177	1,000,000	No	S
Selenium	1/11	0.4 to 1	0.29	0.29	0.46	39	No	B, S
Sodium	8/11	1,000	160 to 387	237	406	1,000,000	No	B, S
Thallium	1/11	0.44 to 2	0.13	0.13	1.2	0.63	No	B, S
Vanadium	11/11	NA	18.8 * to 63.4	33.8	21.8	15	Yes	
Zinc	10/11	4	11.2 to 705	104	15.4	2,300	No	S

See notes at end of table.

Table 6-2 (Continued)
Selection of Human Health Chemicals of Potential Concern for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentrations[2]*	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Other (mg/kg)								
Total petroleum hydrocarbons	3/3	1.8	3.3 to 666	252	NSC	380	Yes	

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for residential soil exposure per January 1993 guidance ("Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," EPA/903/R-93-001) or the Florida Soil Cleanup Target Levels (FDEP, 1998) was used for screening. Values from the USEPA Region III RBC Tables, dated October 1, 1998, are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12). Values are presented in Appendix E of this RI/FS report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background screening concentration; therefore the analyte will not be considered further.
C = This chemical was retained as a HHCPC because another carcinogenic PAH was selected as a HHCPC.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 10-SL-01 through 10-SL-05, 10S00101, 10S00201 (all but *bis*(2-ethylhexyl)phthalate), 10S00201DL (only *bis*(2-ethylhexyl)phthalate), 10S00301 (all but semivolatiles), 1S00301R (only semivolatiles), 10S00401, 10S00501, 10S00601.
Duplicate sample: 10S00101D, 10S00201D.
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501.
Background duplicate sample: BKS00201D.

HHCPC = human health chemical of potential concern.
μg/kg = micrograms per kilogram.
* = average of a sample and its duplicate.
NA = not applicable.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.

Table 6-3
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Volatile Organic Compounds (µg/kg)								
2-Butanone	1/3	11 to 12	51*	51	NA	15,000,000	No	S
Carbon disulfide	3/3	11 to 12	2 to 5	3.2	NA	730,000	No	S
Ethylbenzene	2/3	11 to 12	3* to 20	11.5	NA	240,000	No	S
Toluene	1/3	11 to 12	0.5*	0.5	NA	520,000	No	S
Xylenes (total)	3/3	11 to 12	1 to 4	3	NA	290,000	No	S
Semivolatile Organic Compounds (µg/kg)								
2-Methylnaphthalene	2/3	370 to 420	95 to 175	135	NA	8,200,000	No	S
Acenaphthalene	2/3	370 to 420	110 to 130*	120	NA	12,000,000	No	S
Dibenzofuran	1/3	370 to 420	82	82	NA	820,000	No	S
Fluoranthene	1/3	370 to 420	58*	58	NA	8,200,000	No	S
Fluorene	2/3	370 to 420	140* to 140	140	NA	8,200,000	No	S
Naphthalene	2/3	370 to 420	160 to 250*	205	NA	8,200,000	No	S
Phenanthrene	2/3	370 to 420	77 to 120*	96	NA	6,100,000	No	S
Pyrene	1/3	370 to 420	130*	128	NA	6,100,000	No	S

See notes at end of table.

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Pesticides and PCBs (µg/kg)								
4,4'-DDD	2/3	3.7 to 16.5	1.4 to 10	5.7	NA	17,000	No	S
4,4'-DDE	2/3	3.7 to 16.5	0.66 to 9.3	5	NA	12,000	No	S
4,4'-DDT	1/3	3.7 to 16.5	3.9	3.9	NA	13,000	No	S
Aldrin	1/3	1.9 to 8.65	3.9	3.9	NA	34	No	S
Dieldrin	1/3	3.7 to 16.5	5	5	NA	300	No	S
Inorganic Analytes (mg/kg)								
Aluminum	3/3	NA	12,000* to 12,400	12,200	27,800	200,000	No	B, S
Antimony	1/3	2.8 to 12	7.9	7.9	4.4	32	No	S
Arsenic	3/3	NA	1.7 to 3.7	2.6	6.2	3.7	No	B, S
Barium	3/3	NA	13* to 28.2	18.6	15.8	14,000	No	S
Beryllium	3/3	NA	0.16 to 0.4	0.24	0.26	410	No	S
Cadmium	1/3	0.67 to 1	0.91	0.91	0.92	100	No	B, S
Calcium	2/3	1,000	502 to 4,100	2,301	444	1,000,000	No	S
Chromium	3/3	NA	11.2 to 207	77	22.8	430	No	S

See notes at end of table.

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Inorganic Analytes (mg/kg) (continued)								
Cobalt	1/3	0.75 to 10	2.5	2.5	1.5	12,000	No	S
Copper	3/3	NA	4.5 to 11.9	7.2	8.8	8,200	No	S
Cyanide	1/3	0.1 to 1	0.49	0.49	ND	4,100	No	S
Iron	3/3	NA	7,495 to 44,600	19,948	18,100	61,000	No	B, S
Lead	3/3	NA	13.9* to 82.4	53.7	8.4	400	No	S
Magnesium	3/3	NA	90.9 to 160	133	272	460,468	No	B, S
Manganese	3/3	NA	13.3 to 124	59.3	42.6	4,100	No	S
Mercury	2/3	0.1	0.08 to 0.12	0.1	ND	28	No	S
Nickel	2/3	8	1.9 to 4.2	3.1	5	4,100	No	B, S
Potassium	2/3	154 to 1,000	185 to 192 *	189	181	1,000,000	No	S
Selenium	1/3	0.47 to 1	0.59 *	0.59	0.3	1,000	No	S
Silver	2/3	0.435 to 2	0.46 to 1	0.73	1.1	1,000	No	B, S

See notes at end of table.

Table 6-3 (Continued)
Selection of Human Health Chemicals of Potential Concern for Subsurface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limit	Range of Detected Concentrations	Mean of Detected Concentrations[2]	Background Screening Concentration[3]	Selected Screening Concentration[4]	Analyte HHCPC? (Yes/No)	Reason[5]
Inorganic Analytes (mg/kg) (continued)								
Sodium	2/3	1,000	182 to 212	197	ND	1,000,000	No	S
Vanadium	3/3	NA	19.8 to 104	48.8	45	1,400	No	S
Zinc	3/3	NA	19.4* to 27.3	23.9	15.6	61,000	No	S

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[3] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[4] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), lesser of the U.S. Environmental Protection Agency (USEPA) Region III Risk-Based Concentration (RBC) table for industrial soil exposure per January 1993 guidance ("Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," EPA/903/R-93-001) or Florida Soil Cleanup Target Levels (FDEP, 1998) were used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on an excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Lead value is from the Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12). Values are presented in Appendix E of this RI/FS report.
[5] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background; therefore the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 10SS0201, 10SS0302, 10SS0503.
Sample duplicate: 10SS302A
Background samples: BKB00101, BKB00102, BKB201, BKB00202, BKB00301, BKB00302, BKB00401, BKB00402, BKB00501, BKB00502, BKB00601, BKB00602, BKB00701, BKB00702.
Background duplicate samples: BKB00401D and BKB00602D.

HHCPC = human health chemical of potential concern.
ND = not detected in any background sample.
mg/kg = milligrams per kilogram.
DDD = dichlorodiphenyldichloroethane.
DDT = dichlorodiphenyltrichloroethane.
PCB = Polychlorinated biphenyl.
* = analyte of a sample and its duplicate.
μg/kg = micrograms per kilogram.
DDE = Dichlorodiphenyldichloroethene.
NSC = no screening criteria available.

Table 6-4
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds ($\mu g/\ell$)								
2-Butanone	1/3	10	3.5	3.5	NA	190	No	S
Inorganic Analytes ($\mu g/\ell$)								
Aluminum	3/3	NA	104 to 3,420	1,310	654	200	Yes	
Arsenic	2/3	0.5	2.7* to 3.6	3.2	NA	0.045	Yes	
Barium	3/3	NA	9.9 to 66.1	34.2	72.6	260	No	B, S
Calcium	3/3	NA	14,950* to 45,000	32,200	3,320	1,055,398	No	S
Chromium	2/3	2	3.2* to 12.3	7.8	30	11	No	B
Iron	1/3	5	160.5*	161	964	300	No	B, S
Magnesium	2/3	34	60.6 to 159*	110	2,430	118,807	No	B, S
Manganese	1/3	1	1.6*	1.6	42.8	50	No	B, S
Potassium	3/3	NA	2,200* to 13,200	6,440	1,530	297,016	No	S
Sodium	3/3	NA	1,420 to 4,570	2,670	4,770	160,000	No	B, S
Vanadium	2/3	3.2	15.4* to 21	18.2	3.8	26	No	S
Zinc	1/3	0.6 to 3	7.7*	7.7	200	1,100	No	B, S

See notes at end of table.

Table 6-4 (Continued)
Selection of Human Health Chemicals of Potential Concern
for Unfiltered Groundwater, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium). The lesser of the U.S. Environmental Protection Agency (USEPA), Region III Risk-Based Concentration (RBC) table for tap water exposure per January 1993 guidance ("Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," EPA/903/R-93-001) or the Florida Groundwater Cleanup Target Levels (FDEP, 1998) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on a excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:

B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 09G00101 through 09G00301
Duplicate sample: 09G00301D
Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D

* = analyte of a sample and its duplicate.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.
DDT = dichlorodiphenyltrichloroethane.
HHCPC = human health chemical of potential concern.
NSC = no screening concentration available.
ND = not detected in any background samples.
NR = not reported.

6.2.3.2 Site 10 Groundwater Two groundwater samples (10G00101 and 10G00201) were collected from Site 10 (Figure 3-3). VOCs, SVOCs, pesticides, PCBs, and inorganic data from these samples are evaluated in this HHRA. The 1996 sampling event, which collected groundwater using the low-flow method described in Section 3.5, was evaluated in this HHRA. Table 6-5 presents the HHCPCs selection for groundwater at Site 10. No analytes were selected as HHCPCs in the groundwater.

6.2.4 Surface Water

6.2.4.1 Site 9 Surface Water One surface water sample (09W00101) was collected from Site 9 (Figure 3-4 and Table 3-4). VOCs, SVOCs, pesticides, PCBs, TPH, and inorganic data from this sample are evaluated in this HHRA. As shown in Table 6-6, only arsenic was selected as an HHCPC in surface water.

6.3 EXPOSURE ASSESSMENT.

The exposure assessment methodology is described in Subsection 2.5.3 of the GIR (HLA, 1998). This process involves several steps:

- characterization of the exposure setting in terms of physical characteristics and the populations that may hypothetically be exposed to site-related chemicals;
- identification of potential exposure pathways and receptors; and
- quantification of exposure for each population in terms of the amount of chemical either ingested, inhaled, or absorbed through the skin from all complete or hypothetically complete (potential future) exposure pathways.

Summaries of hypothetical exposure pathways to chemicals detected at Site 9 and Site 10 are presented on Figure 6-1.

The hypothetical pathways including medium and route of exposure, the hypothetical exposed population, and the rationale for pathway selection or exclusion, are provided in Tables 6-7 and 6-8, and are described in more detail in Subsections 6.3.1 through 6.3.3. Receptor-specific exposure parameters for each exposure scenario are presented in Appendix C of the GIR (HLA, 1998). Risk calculation spreadsheets in Appendix C of this RI Report also contain the assumptions for exposure parameters and quantitation of exposures.

6.3.1 Surface Soil No humans currently reside or work at Site 9 and Site 10. There is a current potential exposure for a trespasser (adult or adolescent) and a site maintenance worker; therefore, these two receptors will be evaluated as a current exposure scenario.

Site 9 and Site 10 could be developed eventually for residential land use; therefore, the residential receptor will be evaluated as part of the hypothetical future land-use scenario. Currently there are no buildings at the site; therefore, exposure of occupational workers will be only considered as part of the future land-use scenario. Other possible future exposure scenarios include excavation activities, such as installation of utility lines, and site maintenance, such as mowing the grass.

Table 6-5
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Semivolatile Organic Compounds ($\mu g/\ell$)								
bis(2-Ethylhexyl)phthalate	1/2	10	2	2	NA	4.8	No	S
Inorganic Analytes ($\mu g/\ell$)								
Barium	2/2	40	11 to 16.8	13.9	72.6	260	No	B, S
Calcium	1/2	446	1,140	1,140	3,320	1,055,398	No	B, S
Iron	1/2	5	113	113	964	300	No	B, S
Magnesium	2/2	100	301 to 355	328	2,430	118,807	No	B, S
Manganese	1/2	1	3.5	3.5	42.8	50	No	B, S
Potassium	1/2	417	2,690	2,690	1,530	297,016	No	S
Sodium	2/2	1,000	2,090 to 2,360	2,230	4,770	160,000	No	B, S
Zinc	1/2	3.7	28.6	28.6	200	1,100	No	B, S

See notes at end of table.

Table 6-5 (Continued)
Selection of Human Health Chemicals of Potential Concern for Unfiltered Groundwater, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] *The background screening value is twice the average of detected concentrations for inorganic analytes in background samples.*
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium). The lesser of the U.S. Environmental Protection Agency (USEPA), Region III Risk-Based Concentration (RBC) table for tap water exposure per January 1993 guidance ("Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," EPA/903/R-93-001) or the Florida Groundwater Cleanup Target Levels (FDEP, 1998) was used for screening. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on a excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
B = the maximum detected concentration did not exceed the background screening concentration; therefore, the analyte will not be considered further.
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 10G00101, 10G00201.
Background samples: BKG00101 through BKG00103, BKG00201 through BKG00203, and BKG00301.
Background duplicate sample: BKG00101D.

HHCPC = human health chemical of potential concern.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.

Table 6-6
Selection of Human Health Chemicals of Potential Concern for Surface Water, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentrations Range[2]	Mean of Detected Concentrations[3]	Background Screening Concentration[4]	Selected Screening Concentration[5]	Analyte HHCPC? (Yes/No)	Reason[6]
Volatile Organic Compounds (μg/ℓ)								
Toluene	1/1	10	3*	3	ND	6,800	No	S
Inorganic Analytes (μg/ℓ)								
Aluminum	1/1	200	126*	126	ND	3,700	No	S
Arsenic	1/1	10	2.8*	2.8	ND	0.018	Yes	
Calcium	1/1	5,000	743*	743	ND	1,055,398	No	S
Iron	1/1	100	111.5	111.5	ND	1,100	No	S
Magnesium	1/1	5,000	235*	235	ND	118,807	No	S
Manganese	1/1	15	12.1*	12.1	ND	84	No	S
Potassium	1/1	5,000	305.5*	305.5	ND	297,016	No	S
Sodium	1/1	5,000	898.5*	898.5	ND	160,000	No	S

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] A value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the nondetect.
[3] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] There are no appropriate background screening values available for Site 9.
[5] For all chemicals except the essential nutrients (calcium, magnesium, potassium, and sodium), the Region IV Water Quality Standard for human health criteria (water and organism consumption (January 26, 1995) was used for screening. If no Water Quality Standard is available, then the USEPA Region III Risk-Based Concentration (RBC) table for tap water exposure was used. Actual values are taken from the USEPA Region III RBC Tables dated October 1, 1998, and are based on a excess lifetime cancer risk of 1×10^{-6} or an adjusted hazard quotient of 0.1. For the essential nutrients, screening values were derived based on recommended daily allowances. Values are presented in Appendices B-1 and B-2 of the General Information Report.
[6] Analyte was included or excluded from the risk assessment for the following reasons:
S = the maximum detected concentration did not exceed the screening concentration; therefore, the analyte will not be considered further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 09W00101 Duplicate sample: 09W00101D

HHCPC = human health chemical of potential concern.
μg/ℓ = micrograms per liter.
* = analyte of a sample and its duplicate.
ND = no data available.

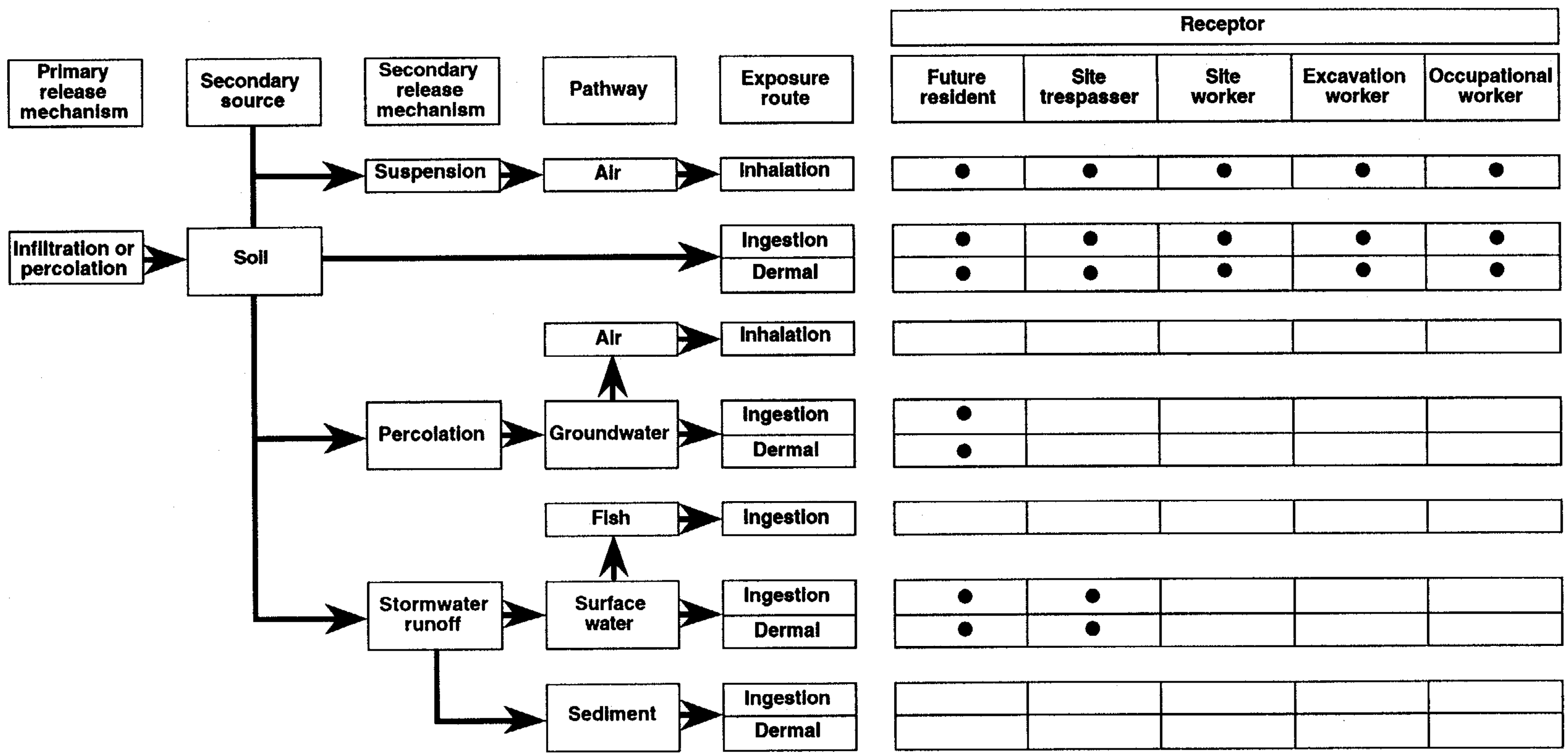


FIGURE 6-1
SITES 9 AND 10, COMPLETE AND POTENTIALLY COMPLETE EXPOSURE PATHWAYS FOR HUMAN RECEPTORS

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

2534-09 FIG 6-1 FINAL 121898 haa

Table 6-7
Summary of Potential Exposure Pathways, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation ?	Reason for Selection or Evaluation
Current Land Use				
Surface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (adult and child) Trespasser (adult and adolescent) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	No Yes No Yes No	No humans currently reside at Site 9. Adolescents and adults may be exposed to contaminants in the surface soil while trespassing. The site maintenance workers may be exposed to contaminants in surface soil, while performing routine site activities.
Groundwater	Ingestion of groundwater as drinking water	Resident (adult)	No	There are no current exposures to groundwater.
Surface water	Ingestion and dermal contact with surface water.	Trespasser (adult and adolescent)	Yes	Adolescent and adult may be exposed to contaminants in surface water while trespassing.
Future Land Use				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (child and adult) Trespasser (adolescent and adult) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	Yes Yes Yes Yes Yes	If Site 9 is developed for residential use, residents could be exposed to chemicals in surface soil. Exposure of trespassers, occupational worker, site maintenance worker and excavation worker to chemicals in surface soil are possible.
Groundwater	Ingestion of groundwater as drinking water and inhalation of volatiles while showering	Resident (adult and child)	Yes	If Site 9 is developed for residential use, drinking water wells in the surficial aquifer could be influenced by contaminants in the groundwater associated with Site 9. Therefore, future residents could be exposed to contaminants in the surficial aquifer.
Surface Water	Ingestion and dermal contact with surface water	Resident (adult and child) Trespasser (adult and adolescent)	Yes Yes	If Site 9 is developed for residential use, residents could be exposed to contaminants in surface water. Trespassers could be exposed to chemicals in surface water while wading.

Table 6-8
Summary of Potential Exposure Pathways, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Medium of Exposure	Route of Exposure	Potentially Exposed Population	Selected for Evaluation ?	Reason for Selection or Evaluation
<u>Current Land Use</u>				
Surface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (adult and child) Trespasser (adult and adolescent) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	No Yes No Yes No	No humans currently reside at Site 10. Adolescents and adults may be exposed to contaminants in the surface soil while trespassing. The site maintenance workers may be exposed to contaminants in surface soil, while performing routine site activities.
Subsurface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation Worker (adult)	No	An excavation worker could be exposed to soils during excavation activities, but no excavation activities are ongoing. Additionally, there were no HHCPCs selected for subsurface soil at Site 10.
Groundwater	Ingestion of groundwater as drinking water	Resident (adult)	No	There are no current exposures to groundwater. Additionally, there were no HHCPCs selected for groundwater.
<u>Future Land Use</u>				
Surface soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Resident (child and adult) Trespasser (adolescent and adult) Occupational worker (adult) Site maintenance worker (adult) Excavation worker (adult)	Yes Yes Yes Yes Yes	If Site 10 is developed for residential use, residents could be exposed to chemicals in surface soil. Exposure of trespassers, occupational worker, site maintenance worker and excavation worker to chemicals in surface soil are possible.
Subsurface Soil	Dermal contact with soil, ingestion of soil, and inhalation of fugitive dust.	Excavation Worker (adult)	No	An excavation worker could be exposed to subsurface soil during utility work or construction activities, however, there were no HHCPCs selected for subsurface soil at Site 10.
Groundwater	Ingestion of groundwater as drinking water and inhalation of volatiles while showering	Resident (adult and child)	No	If Site 10 is developed for residential use, drinking water wells in the surficial aquifer could be influenced by contaminants in the groundwater associated with Site 10, however there were no HHCPCs selected for groundwater at Site 10.

Exposures of hypothetical future residents (adult and child), hypothetical future occupational workers, current and future site maintenance workers, future excavation workers, and current and future trespassers (adult and child) to surface soil contaminants through ingestion, dermal contact, and inhalation of particulates are evaluated in this HHRA.

6.3.2 Subsurface Soil Subsurface soil samples were not collected at Site 9 based on previous surface soil sampling results and the surface soil assessment (see Section 5.6 of this report for more discussion).

There are no current exposures to subsurface soil because no excavation or construction activities are ongoing at Site 10. However, if Site 10 is developed for residential or industrial use or if excavation activities occur in the future, an excavation worker could be exposed to contaminants in subsurface soil. Therefore, exposure of excavation or construction workers to contaminants in subsurface soil (incidental ingestion, dermal contact, and inhalation of fugitive dust) would have been evaluated in this HHRA, but there were no HHCPCs identified.

6.3.3 Groundwater Currently, groundwater at Site 9 and Site 10 is not used for any potable or nonpotable purpose. Nor are there plans to use the water resource in the foreseeable future. However, in the event that Site 9 or areas hydraulically downgradient of Site 9 are developed, the exposure pathway to chemicals in groundwater could become complete (Site 9 only -no HHCPCs were identified for Site 10 groundwater). Therefore, the hypothetical future domestic use of the surficial aquifer (adult and child ingestion) is evaluated in this HHRA as a worst-case estimate of hypothetical future receptors at Site 9 (i.e., future hypothetical worker scenarios are not evaluated). Inhalation of volatiles and dermal contact with groundwater while showering is not evaluated because no VOCs were selected as HHCPCs.

6.3.4 Surface Water Currently, Site 9 (surface water is only present at Site 9) is not used for any residential, occupational, or recreational purpose. Therefore, the only potentially complete exposure pathways are for trespassers (adult or adolescent). If in the future the site is developed, there would also be the potential for residents (adult or child) or site workers to be exposed to surface water. A current and potential future trespasser and potential future resident are evaluated in this HHRA as a worst-case exposure scenario.

6.3.5 Exposure Point Concentrations Exposure point concentrations (EPCs) for all HHCPCs in surface soil, groundwater, and surface water according to Paragraph 2.5.3.3 of the GIR (HLA, 1998). The EPC for HHCPCs is the lesser of the maximum detected concentration or the 95 percent upper confidence limit (UCL) of the arithmetic mean concentration (soil and surface water) or the arithmetic mean of the groundwater plume (groundwater only). This quantification process involves developing assumptions regarding exposure conditions and exposure scenarios for each receptor to estimate the total amount of contaminants that a hypothetical receptor may ingest, dermally absorb, or inhale from each exposure pathway. The ultimate goal of this step, as defined in USEPA guidance, is to identify the combination of these exposure variables or parameters that result in the most intense level of exposure that may "reasonably" be expected to occur under current and future site conditions (USEPA, 1989a).

The EPCs for HHCPCs in surface soil for Site 9 and Site 10 are presented in Tables 6-9 and 6-10, respectively. The EPCs for HHCPCs in groundwater for Site 9 are

Table 6-9
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Soil, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Inorganic Analytes (mg/kg)				
Aluminum	4/5	29,300	NC	29,300
Antimony	1/5	8.3	NC	8.3
Arsenic	5/5	10.1	NC	10.1
Chromium	4/5	46.2	NC	46.2
Iron	4/5	29,800	NC	29,800
Vanadium	4/5	76.7	NC	76.7

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% upper confidence limit (UCL) of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
mg/kg = milligrams per kilogram.
NC = not calculated.

Table 6-10
Exposure Point Concentrations for Human Health Chemicals of Potential Concern for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
Volatile Organic Compounds (μg/kg)				
2-Hexanone	1/11	4.8	6	4.8
Semivolatile Organic Compounds (μg/kg)				
Benzo(a)anthracene	8/11	1,400	1,090	1,090
Benzo(a)pyrene	6/11	2,500	1,300	1,300
Benzo(b)fluoranthene	8/11	2,500	1,420	1,420
Benzo(k)fluoranthene	7/11	2,300	1,050	1,050
Chrysene	9/11	1,600	1,400	1,400
Dibenzo(a,h)anthracene	2/11	1,000	347	347
Indeno(1,2,3-cd)pyrene	4/11	3,200	854	854
Pesticides and PCBs (μg/kg)				
Aroclor-1254	5/11	365	416	365
Inorganic Analytes (mg/kg)				
Aluminum	11/11	37,000	24,300	24,300
Arsenic	11/11	8.8	6.4	6.4
Iron	11/11	23,800	17,500	17,500
Vanadium	11/11	63.4	45.2	45.2
Other (mg/kg)				
Total petroleum hydrocarbons	3/3	666	NC	666

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% upper confidence limit (UCL) of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
μg/kg = micrograms per kilogram.
PCB = polychlorinated biphenyl.
mg/kg = milligrams per kilogram.
NC = not calculated.

presented in Table 6-11. The EPCs for HHCPCs in surface water at Site 9 are presented in Table 6-12. The EPCs were used with receptor-specific exposure parameters to quantify exposures to the HHCPCs, as shown in the risk calculation spreadsheets in Appendix C of this report.

6.4 **TOXICITY ASSESSMENT**. The toxicity assessment methodology is described in Subsection 2.5.4 of the GIR (HLA, 1998). The toxicity assessment evaluates the available evidence on the hypothetical adverse effects associated with exposure to each HHCPC. This information is used to develop a relationship between the extent of exposure and the likelihood or severity of adverse human health effects. Two steps are typically associated with toxicity assessment: hazard identification and dose-response assessment.

- Hazard identification is the process of determining if exposure to an agent can cause a particular adverse health effect and, more importantly, if that effect will occur in humans. The objectives of the hazard identification in the HHRA are to (1) identify which of the contaminants detected at the site are hypothetical hazards, and (2) summarize their potential toxicity in brief nontechnical language.

- A dose-response assessment is conducted to characterize and quantify the relationship between intake, or dose, of an HHCPC and the likelihood of a toxic effect or response. There are categories of toxic effects evaluated in this HHRA: carcinogenic and noncarcinogenic. Following USEPA guidance for HHRAs (USEPA, 1989a), these two endpoints (cancer and noncancer) are evaluated separately. As a result of the dose-response assessment, identified dose-response values are used to estimate the incidence of adverse effects as a function of human exposure to a chemical.

Appendix C of this report contains brief toxicity summaries for HHCPCs identified in surface soil, subsurface soil, groundwater, and surface water at Site 9 and Site 10. Appendix C of this report also contains dose-response information for the HHCPCs (Tables C-5 through C-10). Dose-response values used in this HHRA were current as of November 1997 for Integrated Risk Information System (IRIS) (USEPA, 1997a) and July 1997 for Health Effects Assessment Summary Tables (HEAST) (USEPA, 1997b).

6.5 **RISK CHARACTERIZATION**. Risk characterization is the final step in the risk assessment process. This step involves the integration of the exposure and toxicity assessments into a qualitative or quantitative expression of potential human health risks associated with contaminant exposure. Quantitative estimates of both carcinogenic and noncarcinogenic risks are made for each HHCPC and each complete exposure pathway identified in the exposure assessment. The risk characterization methodology is described in Subsection 2.5.5 of the GIR (HLA, 1998).

Risk estimates for hypothetical exposures to surface soil, groundwater, and surface water under current and hypothetical future land-use scenarios are discussed below in Subsections 6.5.1 through 6.5.4. These risk estimates are then compared to Federal USEPA and FDEP carcinogenic and noncarcinogenic target levels.

Table 6-11
Exposure Point Concentrations for Human Health Chemicals of Potential Concern Groundwater, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	Arithmetic Mean[2]	Exposure Point Concentration[3]
<u>Inorganic Analytes</u> (μg/ℓ)				
Aluminum	3/3	3,420	1,300	1,300
Arsenic	2/3	3.6	2.2	2.2

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] Arithmetic mean of all samples calculated using one-half the contract required quantitation limit and contract required detection limit for nondetects.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Note: μg/ℓ = micrograms per liter.

Table 6-12
Exposure Point Concentrations for Human Health Chemicals of Potential Concern Surface Water, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Maximum Detected Concentration	95% UCL[2]	Exposure Point Concentration[3]
<u>Inorganic Analytes</u> (μg/ℓ)				
Arsenic	1/1	2.8	NC	2.8

[1] Frequency of detection is the number of samples in which the analyte was detected over the total number of samples analyzed (excluding rejected values).
[2] 95% UCL of the arithmetic mean is calculated using all samples. One-half the contract-required quantitation limit/contract-required detection limit is used as a surrogate for nondetects. The UCL is not calculated when there are less than 10 total samples.
[3] Exposure point concentration is the lower of either the 95% UCL concentration or maximum detected concentration.

Notes: % = percent.
UCL = upper confidence limit (see footnote 2).
μg/ℓ = micrograms per liter.
NC = not calculated.

The USEPA guidelines, established in the NCP, indicate that the total lifetime cancer risk due to exposure to HHCPCs at a site, by each complete exposure pathway, should not exceed a range of 1 in 1,000,000 (1×10^{-6}) to 1 in 10,000 (1×10^{-4}) (USEPA, 1990). FDEP has indicated that chemical-specific risks greater than 1 in 1 million (1×10^{-6}) warrant further consideration.

An HQ less than 1 indicates that noncarcinogenic toxic effects are not expected to occur due to HHCPC exposure. Hazard indices (HIs) greater than 1 may be indicative of a possible noncarcinogenic toxic effect, but the circumstances must be evaluated on a case-by-case basis (USEPA, 1989a). As the HI increases, so does the likelihood that adverse effects might be associated with exposure. Both USEPA and FDEP consider that chemicals with HIs greater than 1 warrant further evaluation and require an evaluation of the noncarcinogenic effects.

Table 6-13 summarizes the cancer and noncancer risk under a current land-use scenario for Site 9. Table 6-14 summarizes the cancer and noncancer risk under a hypothetical future land-use scenario for Site 9. Table 6-15 summarizes the cancer and noncancer risk under a current land-use scenario for Site 10. Table 6-16 summarizes the cancer and noncancer risk under a hypothetical future land-use scenario for Site 10.

6.5.1 Surface Soil

6.5.1.1 Site 9 Surface Soil The risk calculations for surface soil exposure are shown in Tables C-11 through C-24 in Appendix C of this report. For the current land-use scenario, the cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 1×10^{-6} for an aggregate (combined adult and adolescent) trespasser, and 5×10^{-7} for a site maintenance worker. Both receptors' cancer risk values are below the USEPA acceptable cancer risk range of 1 in 10,000 to 1 in 1,000,000. The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under current land use (adolescent trespasser, adult trespasser, and site worker) are below USEPA's target HI of 1. Figures 6-2 and 6-3 present summaries of cancer risks and HIs, respectively, associated with exposure scenarios under current land use.

The cancer risks associated with exposure to surface soil ingestion, dermal contact, and fugitive dust inhalation under hypothetical future land use are 3×10^{-5} for an aggregate resident (combined adult and child), 1×10^{-6} for an aggregate trespasser (combined adult and adolescent), 3×10^{-6} for an occupational worker, 5×10^{-7} for a site maintenance worker, and 5×10^{-8} for an excavation worker under hypothetical future land use. Figure 6-4 presents a summary of cancer risk associated with exposure scenarios under future land use. All of these hypothetical future receptor risks are within or below the USEPA acceptable cancer risk range; however, the hypothetical future residential and occupational worker risk exceeds the Florida level of concern of 1×10^{-6} (due to arsenic).

The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under future land use for the (adult) resident, adult and adolescent trespasser, occupational worker, site worker, and excavation worker are at or below USEPA's target HI of 1. The HI for the future child resident is 4. However, the major contributors to this HI are iron (HQ = 1.9), antimony (HQ = 0.5), aluminum (HQ = 0.4), arsenic (HQ = 0.4), and vanadium (HQ = 0.2). As noted above, if the medium-specific HI exceeds USEPA's target of 1, the HQs can

Table 6-13
Risk Summary, Current Land Use, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI	ELCR
Current Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.04	8×10^{-7}
	Dermal contact	0.1	4×10^{-8}
	Inhalation of particulates	ND	3×10^{-9}
	Total Adult Trespasser:	0.1	8×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.06	6×10^{-7}
	Dermal contact	0.1	3×10^{-8}
	Inhalation of particulates	ND	2×10^{-9}
	Total Adolescent Trespasser:	0.2	6×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	1×10^{-6}
Site Maintenance Worker:	Incidental ingestion	0.01	4×10^{-7}
	Dermal contact	0.05	5×10^{-8}
	Inhalation of particulates	ND	1×10^{-8}
	Total Site Maintenance Worker:	0.06	5×10^{-7}
Surface Water:			
Adult Trespasser:	Incidental ingestion	0.002	3×10^{-7}
	Dermal contact	0.0003	3×10^{-8}
	Total Adult Trespasser:	0.002	3×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.0007	4×10^{-8}
	Dermal contact	0.0003	2×10^{-8}
	Total Adolescent Trespasser:	0.001	6×10^{-8}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Water:	NC	3×10^{-7}

Notes: HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.
NE = not evaluated, no carcinogenic CPCs selected.

Table 6-14
Risk Summary, Future Land Use, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI *	ELCR *
Future Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.04	8×10^{-7}
	Dermal contact	0.1	4×10^{-8}
	Inhalation of particulates	ND	3×10^{-9}
	Total Adult Trespasser:	0.1	8×10^{-7}
Adolescent Trespasser:	Incidental ingestion	0.06	6×10^{-7}
	Dermal contact	0.1	3×10^{-8}
	Inhalation of particulates	ND	2×10^{-9}
	Total Adolescent Trespasser:	0.2	6×10^{-7}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	1×10^{-6}
Adult Resident:	Incidental ingestion	0.3	7×10^{-6}
	Dermal contact	0.6	4×10^{-7}
	Inhalation of particulates	ND	1×10^{-7}
	Total Adult Resident:	0.9	8×10^{-6}
Child Resident:	Incidental ingestion	3	2×10^{-5}
	Dermal contact	0.9	2×10^{-7}
	Inhalation of particulates	ND	1×10^{-7}
	Total Child Resident:	4	2×10^{-5}
	Total Risk to Resident (Adult and Adolescent) Exposed to Surface Soil:	NC	3×10^{-5}
Occupational Worker:	Incidental ingestion	0.02	3×10^{-6}
	Dermal contact	0.05	1×10^{-7}
	Inhalation of particulates	ND	4×10^{-8}
	Total Occupational Worker:	0.07	3×10^{-6}
Site Maintenance Worker:	Incidental ingestion	0.01	4×10^{-7}
	Dermal contact	0.05	5×10^{-8}
	Inhalation of particulates	ND	1×10^{-8}
	Total Site Maintenance Worker:	0.06	5×10^{-7}

See notes at end of table.

Table 6-14 (Continued)
Risk Summary, Future Land Use, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use		Exposure Route	HI *	ELCR *
	Excavation Worker:	Incidental ingestion	0.03	5×10^{-8}
		Dermal contact	0.01	6×10^{-10}
		Inhalation of particulates	ND	6×10^{-10}
		Total Excavation Worker:	0.04	5×10^{-8}
Ground Water:				
	Adult Resident:	Ingestion of Ground Water as Drinking Water	0.2	3×10^{-5}
		Total Adult Resident:	0.2	3×10^{-5}
	Child Resident:	Ingestion of Ground Water as Drinking Water	0.6	2×10^{-5}
		Total Child Resident:	0.6	2×10^{-5}
		Total Risk to Resident (Adult and Child) Exposed to Ground Water:	NC	5×10^{-5}
Surface Water				
	Adult Trespasser:	Incidental ingestion	0.002	3×10^{-7}
		Direct Contact	0.0003	3×10^{-8}
		Total Adult Trespasser:	0.002	3×10^{-7}
	Adolescent Trespasser:			
		Incidental ingestion	0.0007	7×10^{-8}
		Direct Contact	0.0003	4×10^{-8}
		Total Adolescent Trespasser:	0.001	1×10^{-7}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Water:	NC	3×10^{-7}
	Adult Resident			
		Incidental ingestion	0.002	3×10^{-7}
		Direct Contact	0.0003	4×10^{-8}
		Total Adult Resident:	0.002	3×10^{-7}
	Child Resident			
		Incidental ingestion	0.02	9×10^{-7}
		Direct Contact	0.0009	3×10^{-8}
		Total Child Resident	0.02	9×10^{-7}
		Total Risk to Resident (Adult and Child) Exposed to Surface Water:	NC	1×10^{-6}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil and Surface Water:	NC	2×10^{-6}
		Total Risk to Resident (Adult and Child) Exposed to Surface Soil, Ground Water and Surface Water:	NC	8×10^{-5}

Notes: HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.
NE = not evaluated, no carcinogenic CPCs selected.

Table 6-15
Risk Summary, Current Land Use, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use		Exposure Route	HI *	ELCR *
Current Land Use				
Surface Soil:				
	Adult Trespasser:	Incidental ingestion	0.03	1×10^{-6}
		Dermal contact	0.04	6×10^{-7}
		Inhalation of particulates	ND	1×10^{-10}
		Total Adult Trespasser:	0.1	2×10^{-6}
	Adolescent Trespasser:	Incidental ingestion	0.05	1×10^{-6}
		Dermal contact	0.05	4×10^{-7}
		Inhalation of particulates	ND	8×10^{-11}
		Total Adolescent Trespasser:	0.1	1×10^{-6}
		Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	3×10^{-6}
	Site Maintenance Worker:	Incidental ingestion	0.01	6×10^{-7}
		Dermal contact	0.03	5×10^{-7}
		Inhalation of particulates	ND	7×10^{-10}
		Total Site Maintenance Worker:	0.04	1×10^{-6}

Notes: * = receptor totals may vary from spreadsheets due to rounding algorithm.
HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.
ND = no dose-response data for this exposure route were available for HHCPCs in this medium.

Table 6-16
Risk Summary, Future Land Use, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI *	ELCR *
Future Land Use			
Surface Soil:			
Adult Trespasser:	Incidental ingestion	0.03	1×10^{-6}
	Dermal contact	0.04	6×10^{-7}
	Inhalation of particulates	ND	1×10^{-10}
	Total Adult Trespasser:	0.1	2×10^{-6}
Adolescent Trespasser:	Incidental ingestion	0.05	1×10^{-6}
	Dermal contact	0.05	4×10^{-7}
	Inhalation of particulates	ND	8×10^{-11}
	Total Adolescent Trespasser:	0.1	1×10^{-6}
	Total Risk to Trespasser (Adult and Adolescent) Exposed to Surface Soil:	NC	3×10^{-6}
Adult Resident:	Incidental ingestion	0.2	1×10^{-5}
	Dermal contact	0.3	5×10^{-6}
	Inhalation of particulates	ND	5×10^{-9}
	Total Adult Resident:	0.5	2×10^{-5}
Child Resident:	Incidental ingestion	2	3×10^{-5}
	Dermal contact	0.5	2×10^{-6}
	Inhalation of particulates	ND	7×10^{-9}
	Total Child Resident:	3	3×10^{-5}
	Total Risk to Resident (Adult and Adolescent) Exposed to Surface Soil:	NC	5×10^{-5}
Occupational Worker:	Incidental ingestion	0.08	2×10^{-6}
	Dermal contact	0.08	1×10^{-6}
	Inhalation of particulates	ND	2×10^{-9}
	Total Occupational Worker:	0.2	3×10^{-6}

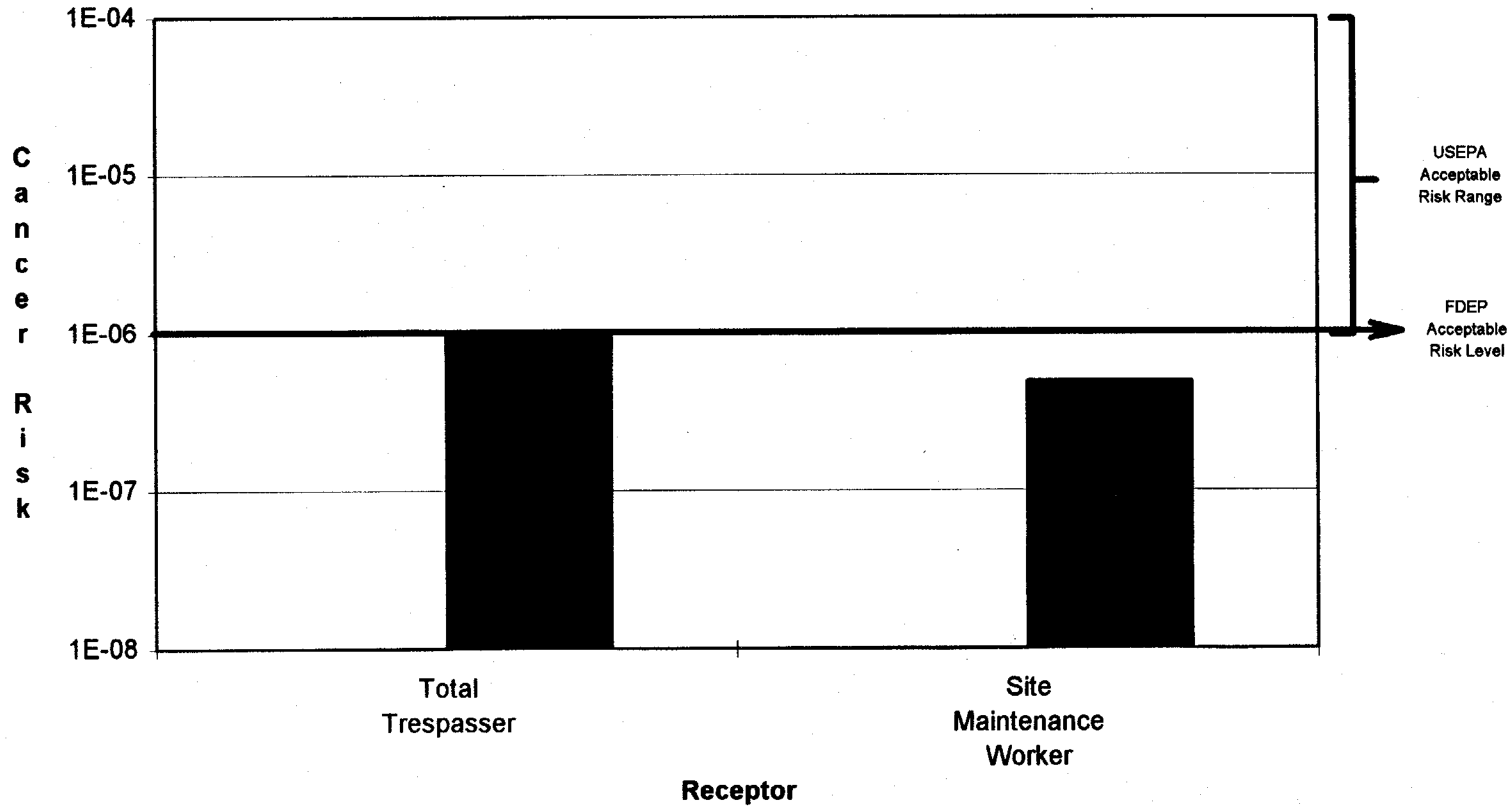
See notes at end of table.

Table 6-16 (Continued)
Risk Summary Future Land Use, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Land Use	Exposure Route	HI *	ELCR *
Future Land Use (continued)			
Site Maintenance Worker:	Incidental ingestion	0.01	6×10^{-7}
	Dermal contact	0.03	5×10^{-7}
	Inhalation of particulates	ND	7×10^{-10}
	Total Site Maintenance Worker:	0.04	1×10^{-6}
Excavation Worker:	Incidental ingestion	0.1	5×10^{-8}
	Dermal contact	0.03	6×10^{-10}
	Inhalation of particulates	ND	3×10^{-11}
	Total Excavation Worker:	0.1	5×10^{-8}

Notes: * = receptor totals may vary for spreadsheets due to rounding algorithm.
HI = hazard index.
ELCR = excess lifetime cancer risk.
NC = not calculated because child and adult HIs are not additive.
ND = no dose-response data for this exposure route were available for HHCPCs in this medium.
NE = not evaluated, no carcinogenic CPC selected.

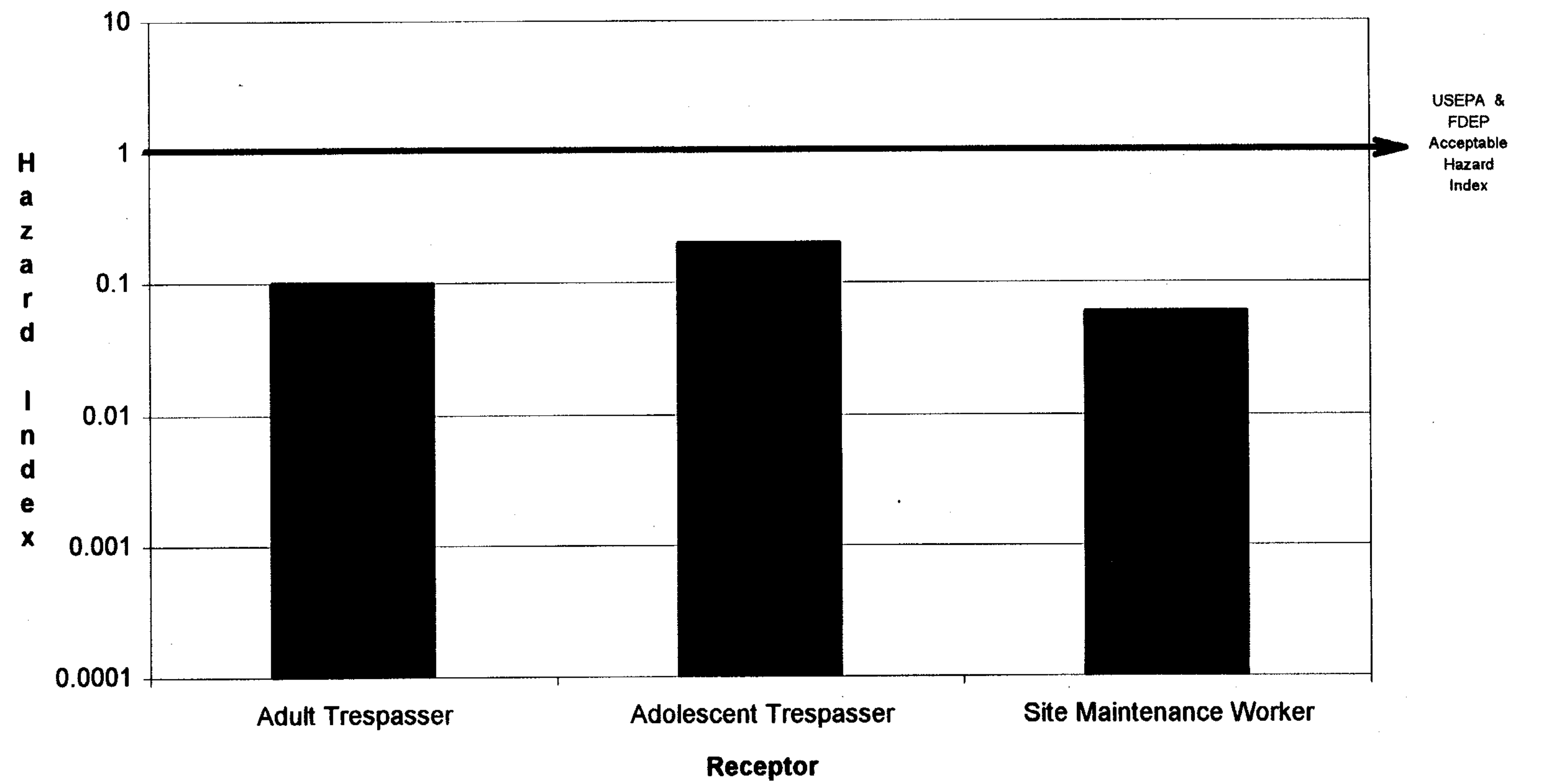


NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-2
CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL
DISPOSAL PIT AND SOUTHEAST OPEN
DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA



NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-3
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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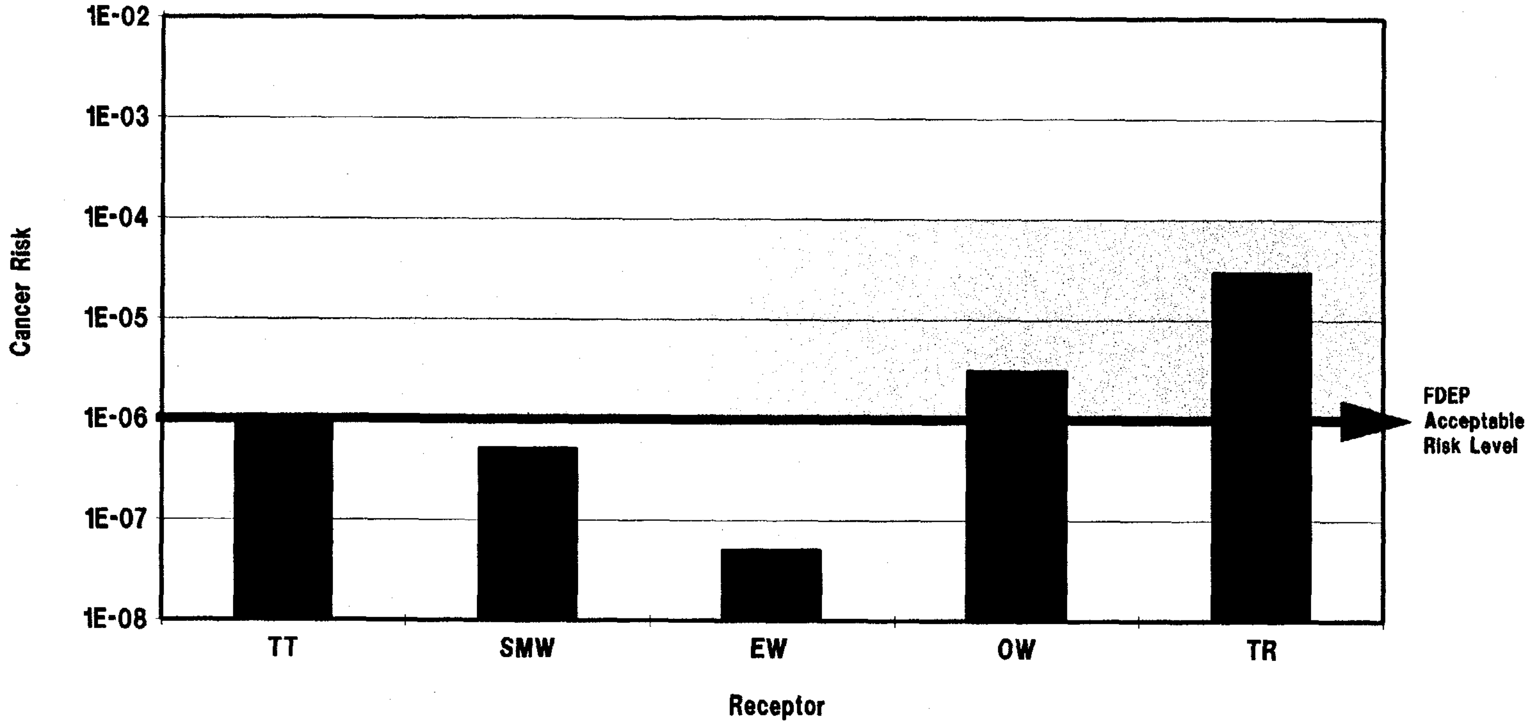

LEGEND

(shaded box)	USEPA acceptable risk range
USEPA	U.S. Environmental Protection Agency
FDEP	Florida Department of Environmental Protection
TT	Total trespasser
SMW	Site maintenance worker
EW	Excavation worker
OW	Occupational worker
TR	Total resident

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FIGURE 6-4

CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

be segregated by target organ effects to determine if the target organ-specific HIs exceed 1. However, only the HQ of iron exceeds 1, so segregation of the HQs is not necessary. This will be discussed in the uncertainty analysis section. Figure 6-5 presents a summary of HIs associated with exposure scenarios under future land use.

6.5.1.2 Site 10 Surface Soil The risk calculations for surface soil exposure are shown in Tables C-25 through C-38 in Appendix C to this report. The cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 4×10^{-6} for an aggregate (combined adult and adolescent) trespasser, and 1×10^{-6} for a site maintenance worker. Both receptors' cancer risk values are less than the USEPA acceptable cancer risk range of 1×10^{-4} to 1×10^{-6}, but the aggregate trespasser exceeds the FDEP target risk of 1×10^{-6} due to arsenic and carcinogenic PAHs. The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation under current land use (adolescent trespasser, adult trespasser, and site worker) are below USEPA's and FDEP's target HI of 1.

Figures 6-6 and 6-7 present summaries of cancer risks and HIs, respectively, associated with exposure scenarios under current land use.

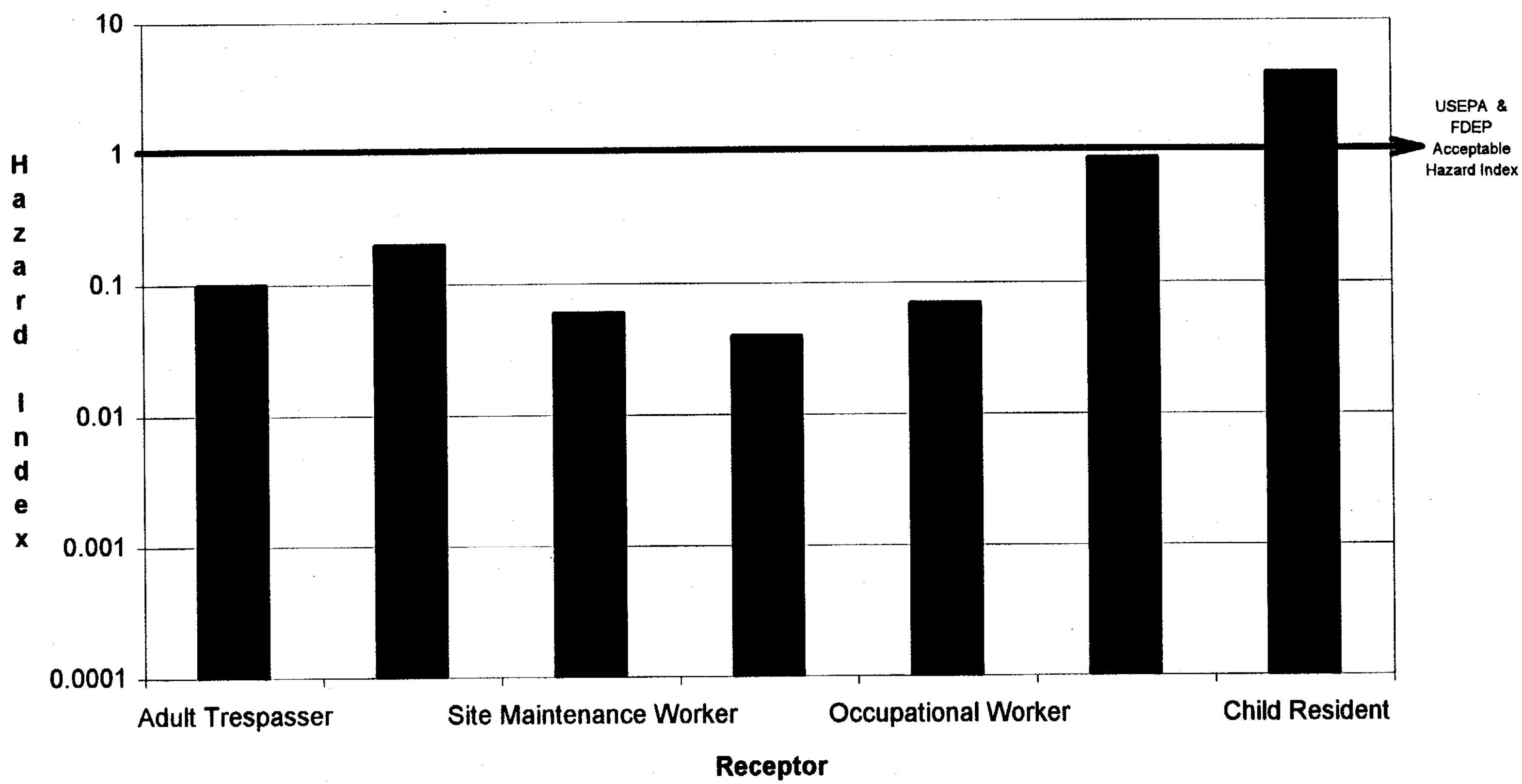
The cancer risks associated with exposure to surface soil (ingestion, dermal contact, and fugitive dust inhalation) are 5×10^{-5} for an aggregate resident (combined adult and child), 3×10^{-6} for an aggregate trespasser (combined adult and adolescent), 3×10^{-6} for an occupational worker, 1×10^{-6} for a site maintenance worker, and 5×10^{-8} for an excavation worker. All of these potential future receptor risks are within or less than the USEPA acceptable cancer risk range; however, the hypothetical future residential, trespasser, and occupational worker risk exceeds the Florida target risk of 1×10^{-6} (mainly due to carcinogenic PAHs and arsenic).

Figure 6-8 presents a summary of cancer risk associated with exposure scenarios under future land use.

The noncancer risks associated with surface soil ingestion, dermal contact, and fugitive dust inhalation for all evaluated receptors (except the child resident) are at or below USEPA's and FDEP's target HI of 1. The noncancer risk associated with a child resident for soil ingestion and dermal contact is 3. This HI is above the USEPA's and FDEP's target HI of 1. Major contributors to the risk for child resident are Aroclor-1254 (HQ=0.3), aluminum (HQ=0.3), arsenic (HQ=0.3), iron (HQ=1), and TPH (HQ=0.3). If the medium-specific HIs exceed USEPA's and FDEP's target of 1, the HQs can be segregated by target organ effects to determine if the target organ-specific HIs exceed 1. The individual Aroclor-1254, aluminum, arsenic, iron, and TPH HQs do not exceed 1. The HI for iron is addressed in the uncertainty analysis section. Figure 6-9 presents a summary of HIs associated with exposure scenarios under future land use.

<u>6.5.2 Site 9 Groundwater</u> The risk calculations for Site 9 groundwater exposure are shown in Tables C-39 and C-40 in Appendix C of this report. Currently, there are no potable supply wells at the site; thus, there is no human exposure to groundwater. Therefore, risk was not evaluated for the current land-use scenario.

The cancer risks associated with exposure to groundwater ingestion under hypothetical future land use are 5×10^{-5} for an aggregate resident (combined adult



NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-6
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL
DISPOSAL PIT AND SOUTHEAST OPEN
DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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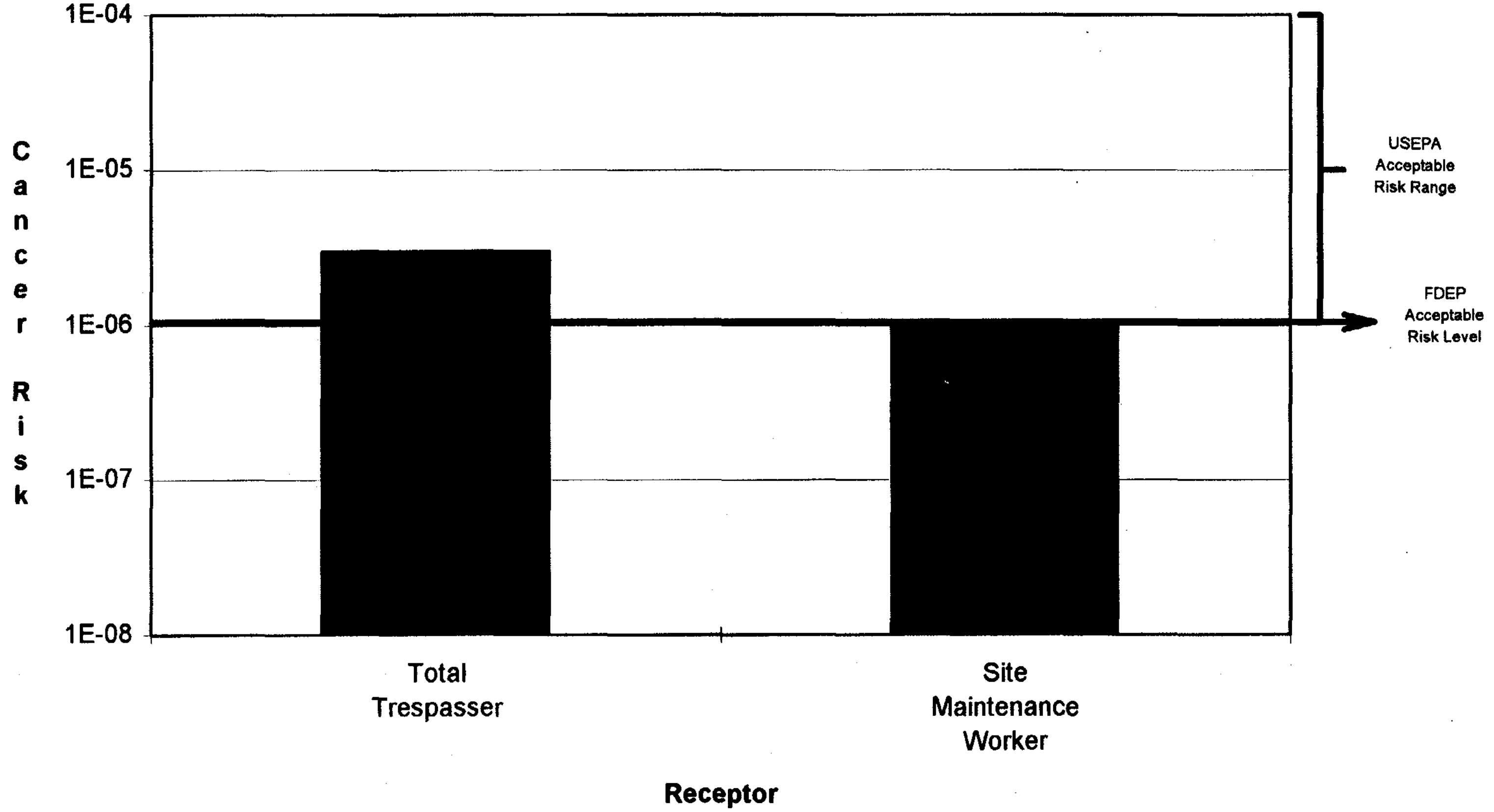

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-6
CANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL
AT SITE 10

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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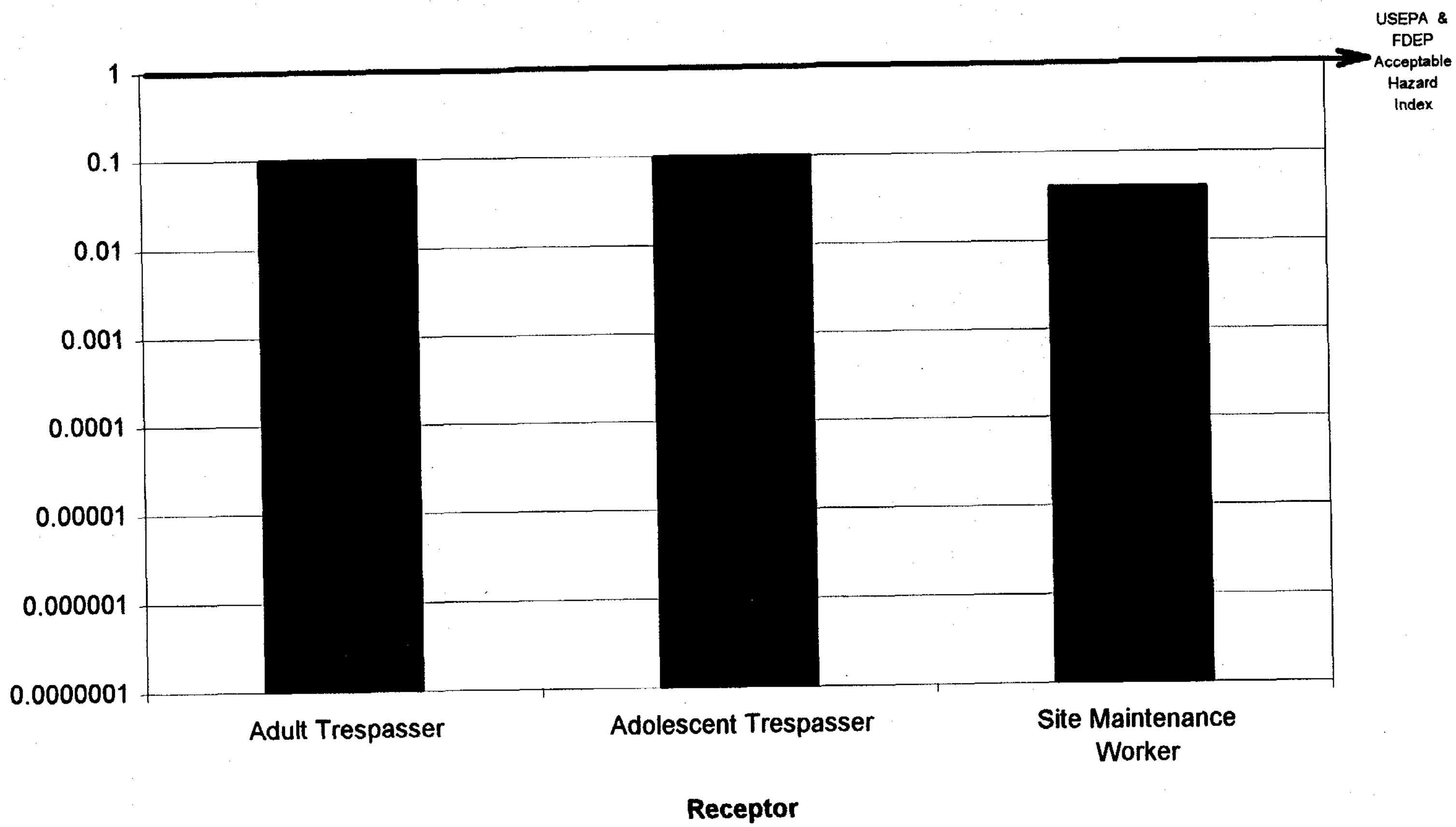

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-7
NONCANCER RISK SUMMARY
CURRENT LAND USE FOR SURFACE SOIL
AT SITE 10

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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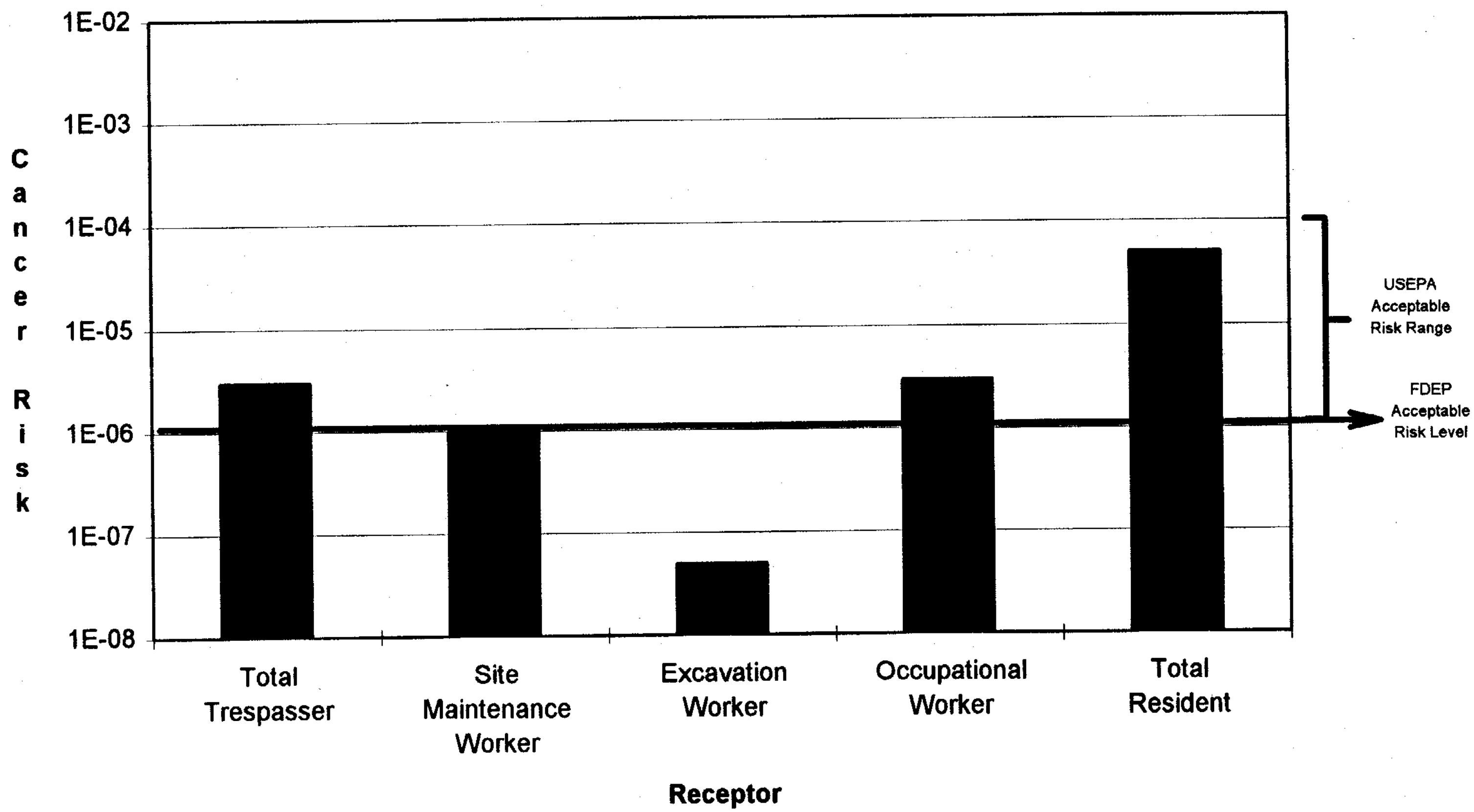

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-8
CANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL AT SITE 10

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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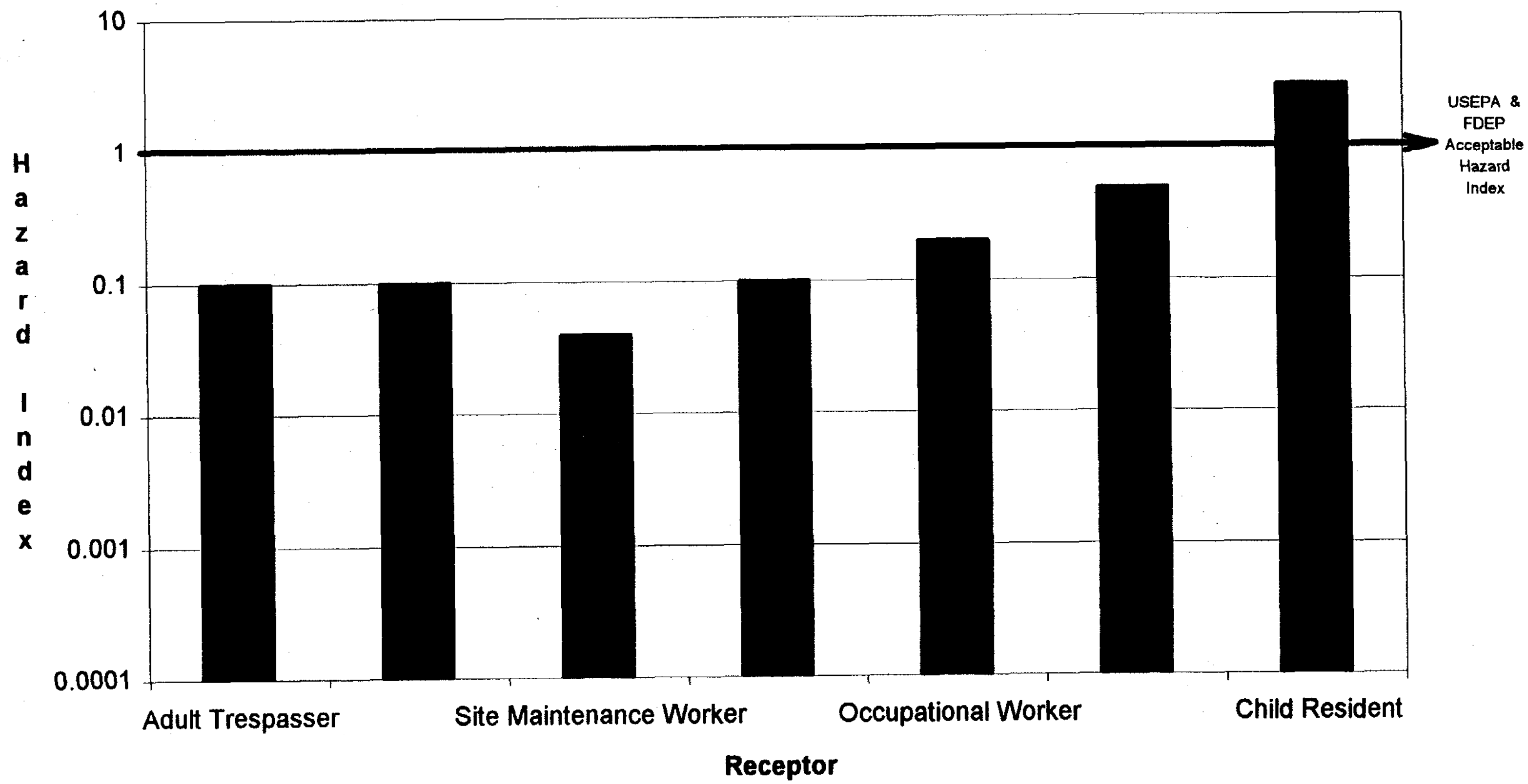

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-9
NONCANCER RISK SUMMARY
FUTURE LAND USE FOR SURFACE SOIL
AT SITE 10

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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and child). Figure 6-10 presents a summary of cancer risk associated with exposure scenarios under future land use. These hypothetical future receptor risks are below the USEPA acceptable cancer risk range; however, they exceed the Florida level of concern of 1×10^{-6} (due to arsenic).

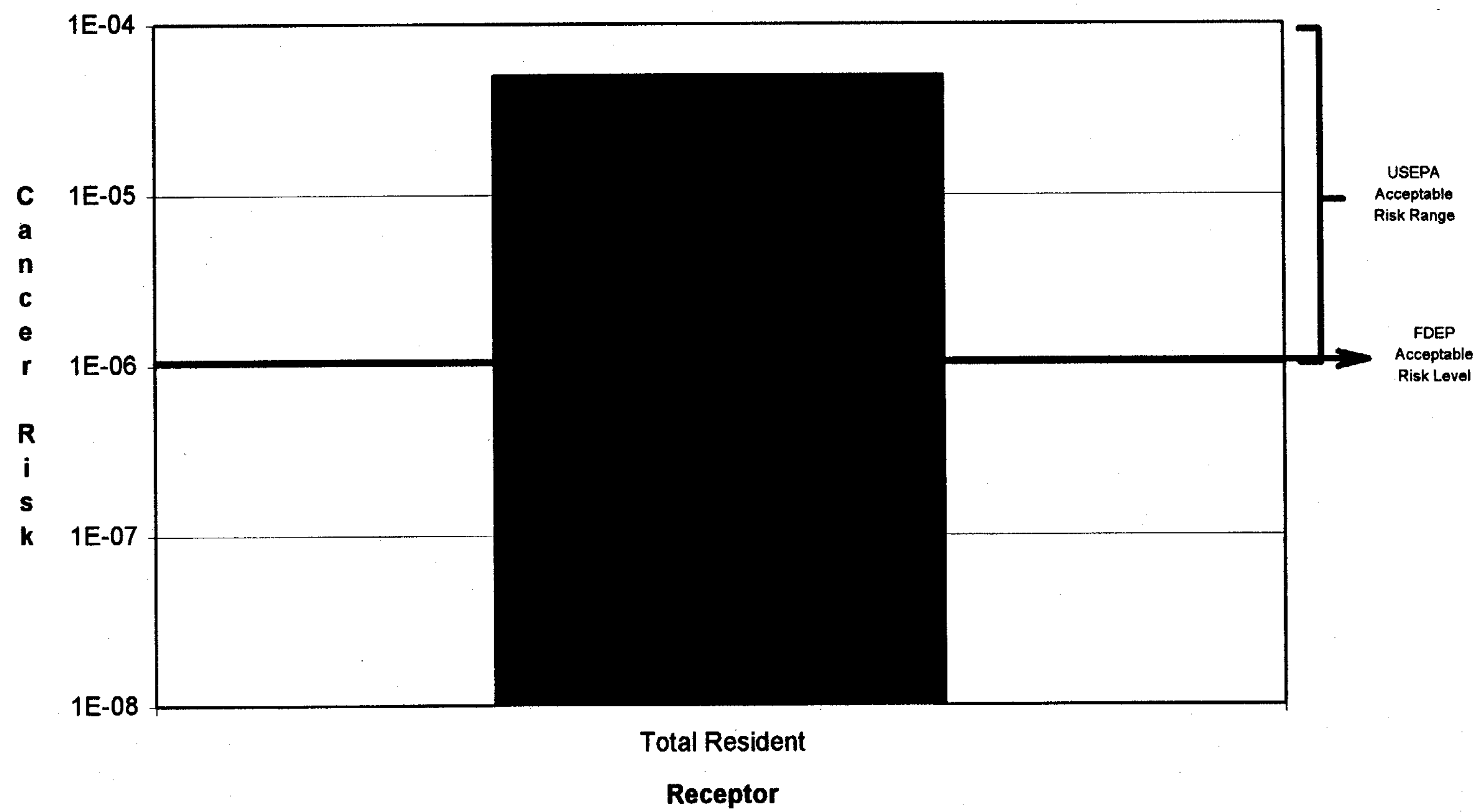
Under hypothetical future land use, the noncancer risks associated with groundwater ingestion are 0.2 for the adult resident and 0.6 for the child resident. Both of these HIs are below the USEPA's and FDEP's target HI of 1. Figure 6-11 present a summary of the noncancer risk to potential future residents.

<u>6.5.3 Site 9 Surface Water</u> The risk calculations for surface water exposure are shown in Tables C-41 and C-45 in Appendix C of this report. Risk was evaluated for the current and future land-use scenario. The cancer risks associated with exposure to surface water (ingestion and dermal contact) are 3×10^{-7} for an aggregate (combined adult and adolescent) trespasser. Receptors' cancer risk values are less than the USEPA acceptable cancer risk range of 1×10^{-4} to 1×10^{-6} and less than FDEP's target risk of 1×10^{-6}. Figure 6-12 presents a summary of the cancer risk associated with current use of surface water at Site 9. The noncancer risks associated with surface water ingestion and dermal contact under current land use (adolescent trespasser and adult trespasser) are below USEPA's and FDEP's target HI of 1. Figure 6-13 presents a summary of the noncancer risks associated with current use of surface water at Site 9.

The cancer risks associated with exposure to surface water ingestion and dermal contact under hypothetical future land use are 3×10^{-7} for an aggregate trespasser (combined adult and child) and 1×10^{-6} for resident (combined adult and child). Figure 6-14 presents a summary of cancer risk associated with exposure scenarios under future land use. All of these hypothetical future receptor risks are below or at the USEPA acceptable cancer risk range and the Florida level of concern of 1×10^{-6}.

Under hypothetical future land use, the noncancer risks associated with surface water ingestion are 0.002 for the adult trespasser, 0.001 for the adolescent trespasser, 0.002 for the adult resident, and 0.02 for the child resident. These HIs do not exceed USEPA's target HI of 1. Figure 6-15 presents a summary of the noncancer risk to potential future residents.

<u>6.5.4 Cumulative Risk</u> USEPA Region IV guidance requires an assessment of a cumulative receptor risk. In this HHRA, only the hypothetical future residential receptor could hypothetically be exposed to both surface soils, groundwater, and surface water, and a trespasser could be exposed to surface soils and surface water. The cumulative risk to hypothetical future residential receptors is equal to the soil and groundwater risk. The cumulative noncancer risk to hypothetical future residential receptors is also approximately equal to the risk from soil. The cumulative trespasser potential cancer risk from surface soil and surface water is 2×10^{-6}, the potential noncancer risk for the adult trespasser is 0.1, and the potential noncancer risk for the adolescent trespasser is 0.2. A cumulative assessment of Site 10 is not necessary because HHCPCs were identified only for surface soil. The Site 10 surface soil risk to potential future residents can then be summed with the Site 9 potential risk from surface soil for a cumulative total potential cancer risk for residents of 8×10^{-5} and for trespassers of 4×10^{-6} at Sites 9 and 10. The cumulative potential noncancer risk for the adult resident is 1 and for the child resident is 7 for surface soil.



NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-10
CANCER RISK SUMMARY
FUTURE LAND USE OF GROUNDWATER
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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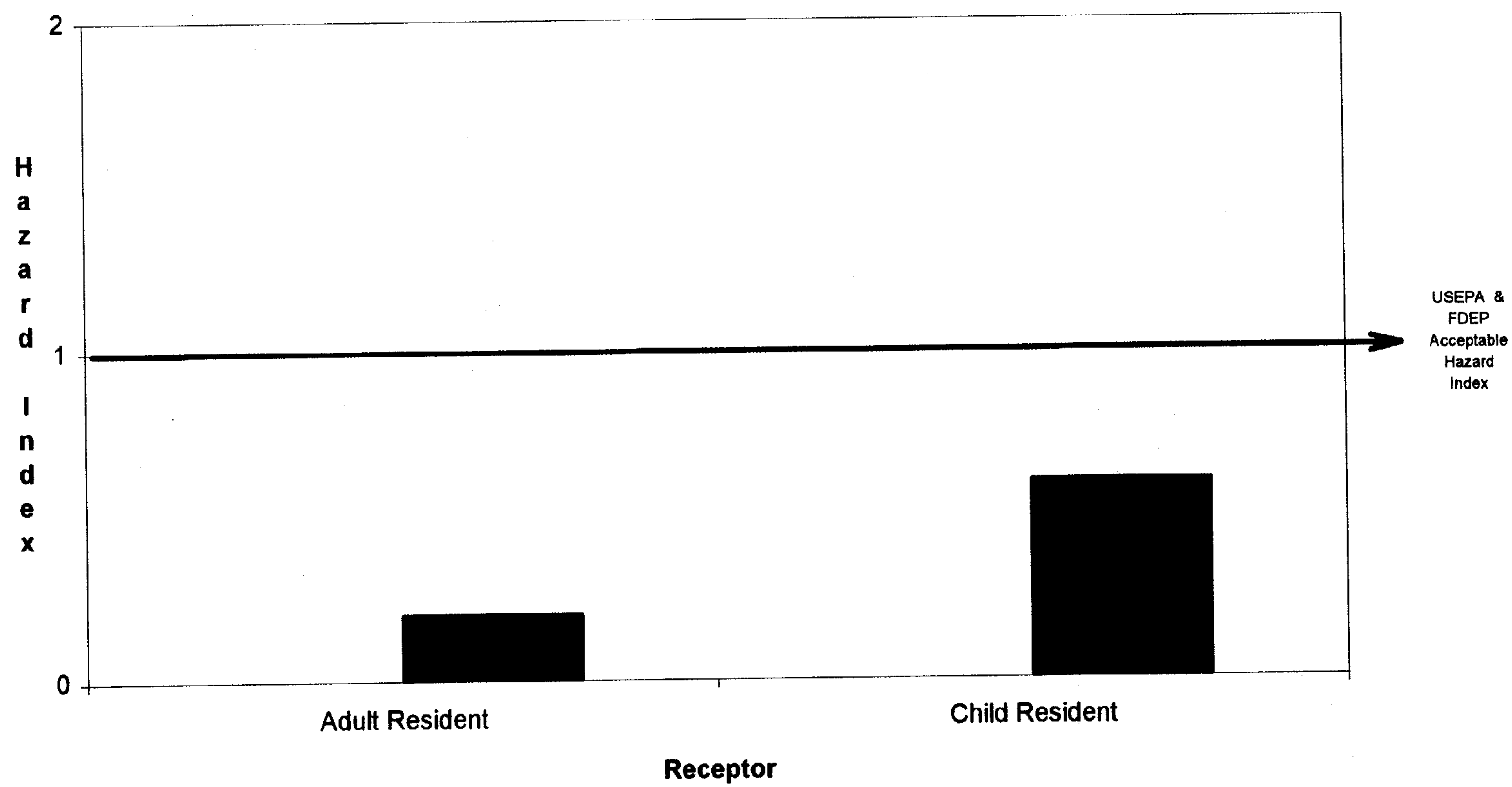

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-11
NONCANCER RISK SUMMARY
FUTURE LAND USE OF GROUNDWATER
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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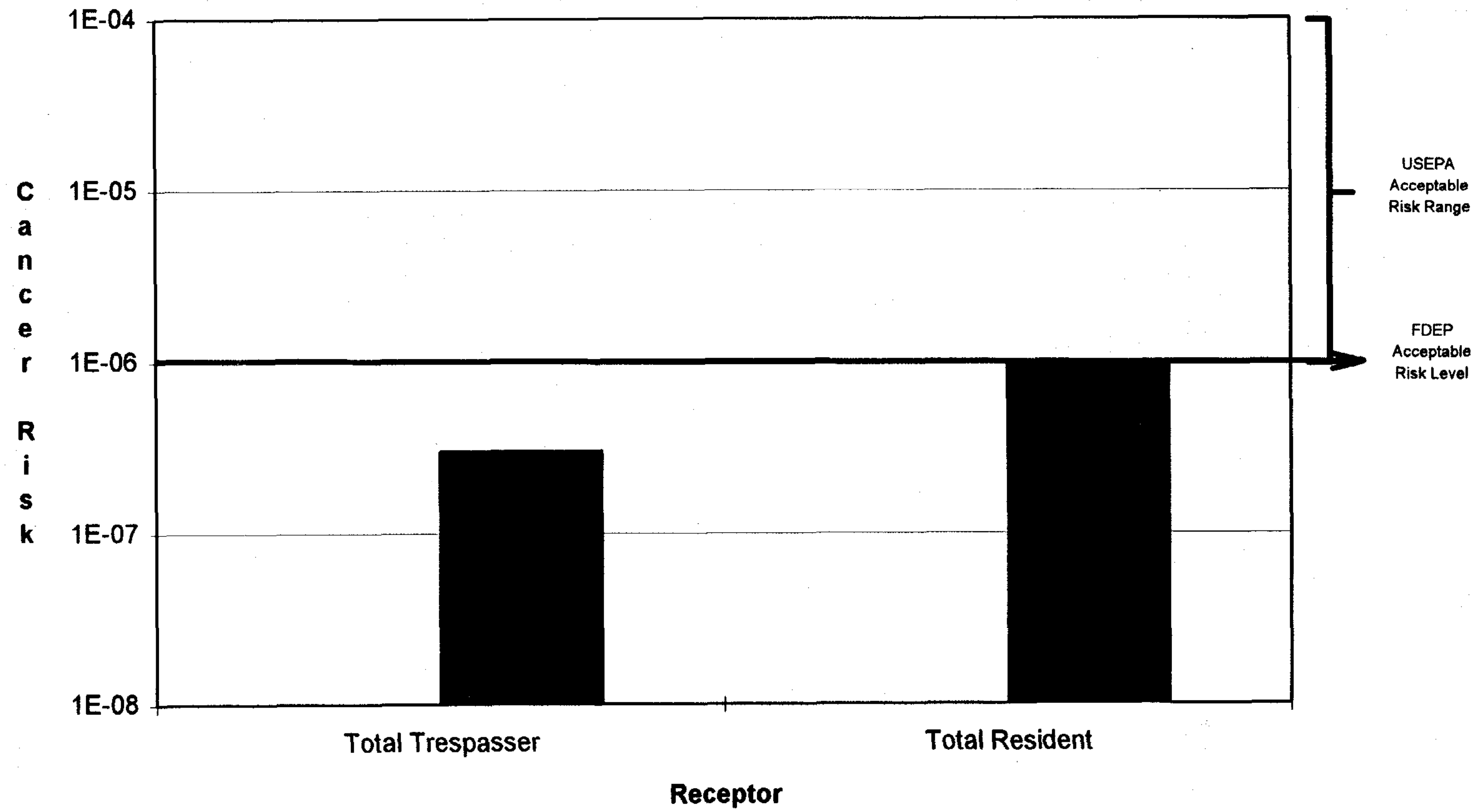

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-12
CANCER RISK SUMMARY
CURRENT LAND USE OF SURFACE WATER AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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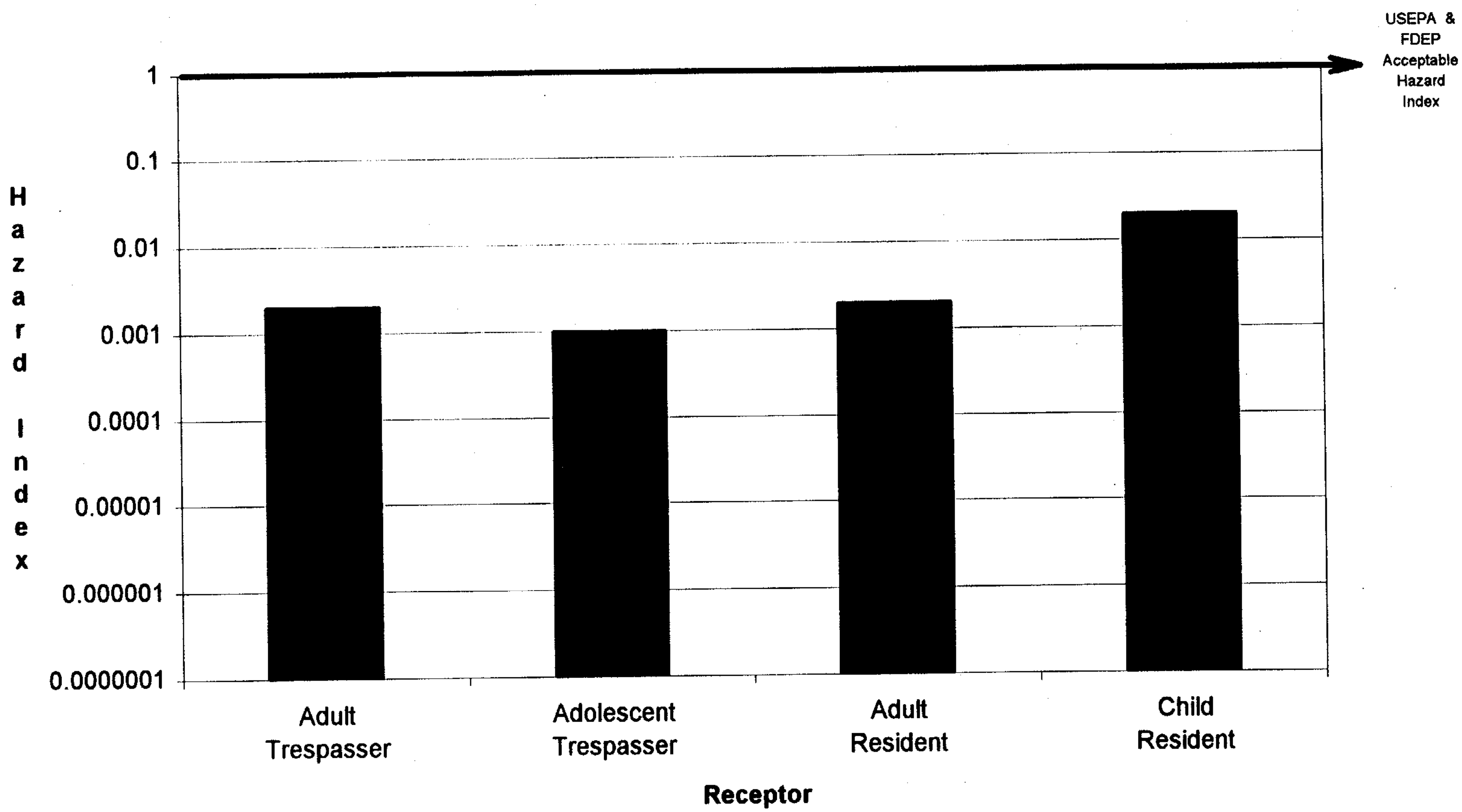

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-13
NONCANCER RISK SUMMARY
CURRENT LAND USE OF SURFACE WATER
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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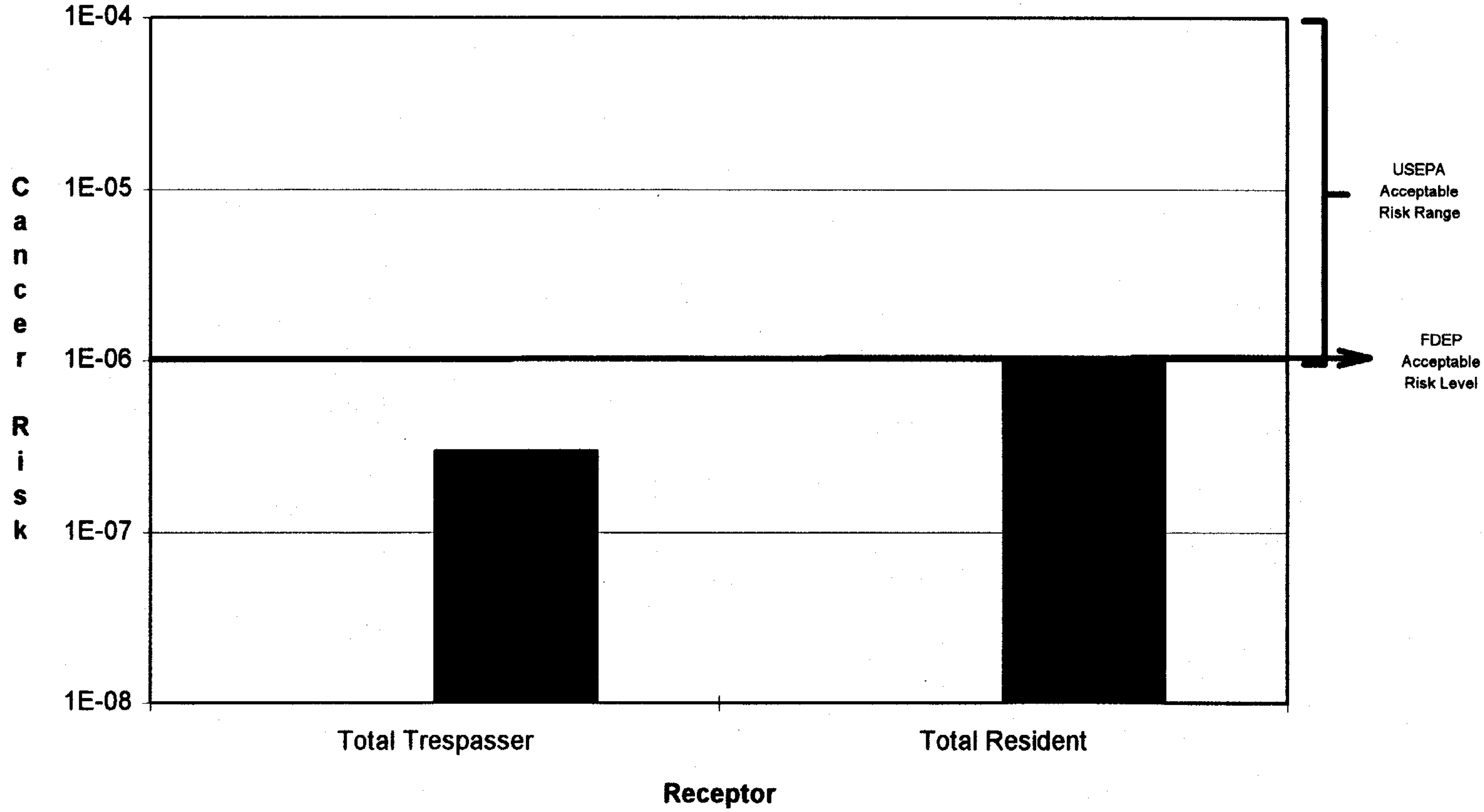

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-14
CANCER RISK SUMMARY
FUTURE LAND USE OF SURFACE WATER
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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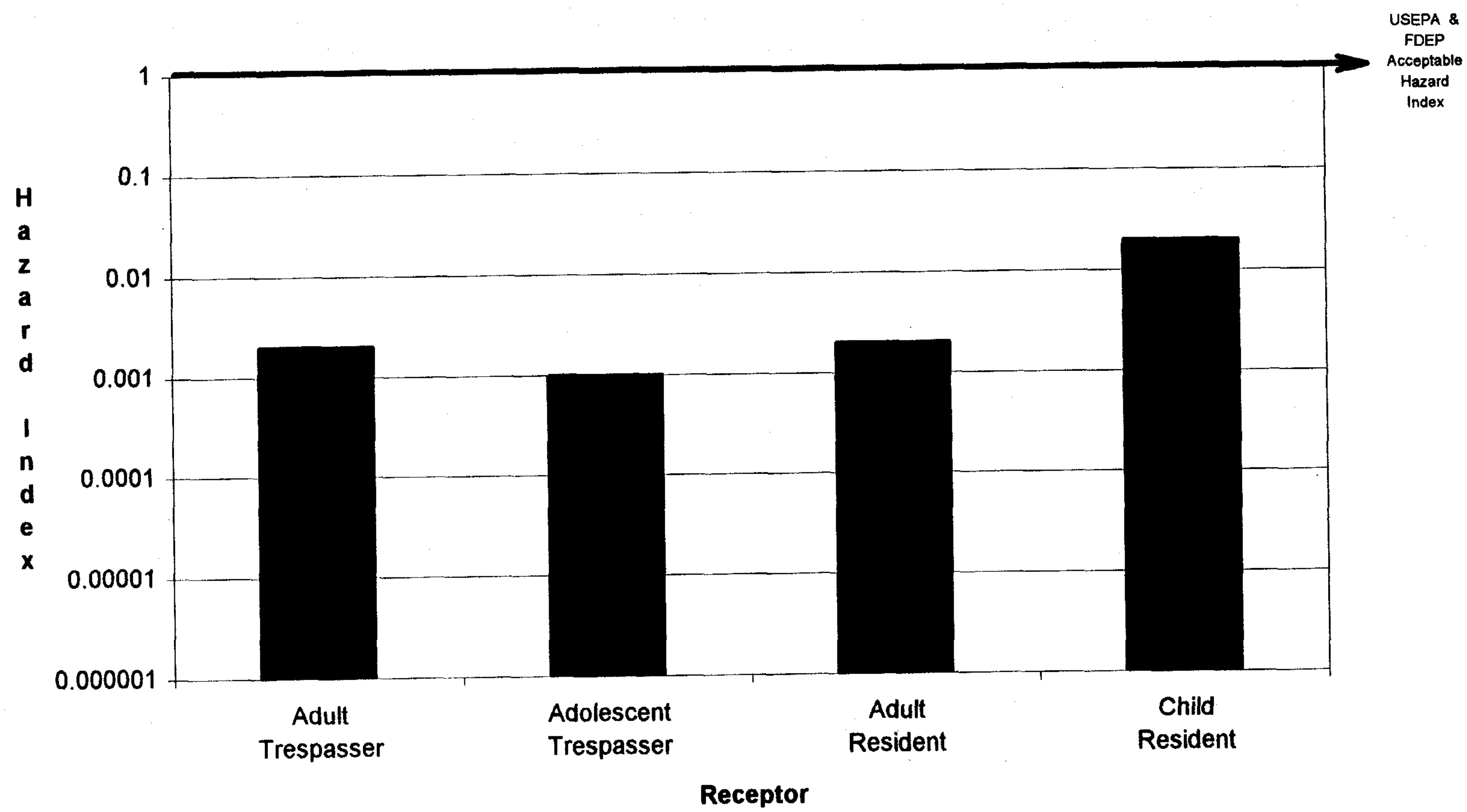

NOTES:
USEPA = U.S. Environmental Protection Agency
FDEP = Florida Department of Environmental Protection

FIGURE 6-16
NONCANCER RISK SUMMARY
FUTURE LAND USE OF SURFACE WATER
AT SITE 9

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (B)

NAVAL AIR STATION WHITING FIELD
MILTON, FLORIDA

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The cumulative potential noncancer risk for the adult trespasser is 0.2 and for the adolescent trespasser is 0.3 for surface soil.

6.6 UNCERTAINTY ANALYSIS. General uncertainties associated with the collection, analysis, and evaluation of data; exposure assessment; toxicity assessment; and the risk estimation process are discussed in Paragraph 2.5.5.1 of the GIR (HLA, 1998). Site-specific uncertainties that are important for the interpretation of the calculated risk estimates for surface soil, subsurface soil, groundwater, and surface water at Site 9 and Site 10 are discussed below.

- The surface soil carcinogenic risks at Site 9 and Site 10 are driven by a metal (arsenic) that is likely naturally occurring. It is uncertain whether or not this risk to hypothetical future residents and occupational workers is actually due to past site operations. The arsenic may actually be at naturally occurring levels or due to other anthropogenic sources such as pesticides application. Additionally, PAHs at Site 10 may be due to anthropogenic sources, such as runoff from roadways, that are not site related.

- Noncancer risk at Sites 9 and 10 are driven by iron. The maximum detected concentrations at both sites are below the essential nutrient screening value. The EPC for iron of 29,800 mg/kg is below the essential nutrient value; therefore, this risk is likely to be an overestimate.

- The lack of inhalation reference doses for the HHCPCs in surface soil may have resulted in underestimates of the HIs associated with exposure to surface soil at Site 9 and Site 10; however, these noncancer risks are not likely to be significant when compared to oral risks that are fully characterized.

- The SQLs were compared to the risk-based screening criteria and Florida and State regulatory guidelines for all analytes not selected as HHCPCs to assess whether or not the detection limits were adequate to detect analytes at levels of concern (SQLs of analytes with 100 percent frequency of detection were not evaluated). Analytes with an SQL that exceeds their corresponding screening criteria are beryllium in surface soil at Site 9 and Aroclor-1260, dieldrin, alpha-chlordane, and beryllium in Site 10 surface soil. Although these SQLs exceed risk-based screening criteria, in each case the detected concentrations were less than the SQL. Therefore, because the laboratory equipment was able to detect less than the SQL, it was assumed that the SQL was adequate for the HHRA.

- Some uncertainty is associated with the representativeness of the groundwater data used to complete the risk evaluation at Site 9 and Site 10. Generally, because the low-flow purging and sampling method was used, turbidity in the unfiltered groundwater samples was minimal. However, the analytical results for some of the unfiltered samples may be biased high for inorganic constituents as a result of suspended solids.

- According to the methodology described in the GIR (HLA, 1998) (Paragraph 2.5.3.3), central tendency (CT) carcinogenic risk receptors that have risks exceeding levels of concern were evaluated. The CT evaluation involved using the UCL of the mean concentration and reasonable but less conservative exposure parameters which is designed to provide a probable risk level (USEPA, 1995a). CT values were obtained from USEPA guidance (USEPA, 1992a) where possible. Deviations from the USEPA 1992 guidance were made and are noted when site-specific or professional judgement deemed necessary.

Site 9 The hypothetical future resident reasonable maximum exposure (RME) carcinogenic risk exceeded its target of 1×10^{-6}. The CT carcinogenic risk calculations for hypothetical future residential receptors are presented in Tables C-45 through C-49 in Appendix C of this report. The CT parameters differ from the RME exposure scenario by using the mean detected concentration and a 50 percentile ingestion rate, surface area, and exposure duration. The CT aggregate residential risk exposed to surface soil is 1×10^{-6}. The CT noncarcinogenic risk for hypothetical future child resident is 2, and CT exceeds the Florida target level. The hypothetical future occupational worker exposed to surface soil is 5×10^{-7}. The CT carcinogenic risk for a future resident exposed to groundwater is 1×10^{-5}. The risk ranges presented by the RME and CT exposure scenarios for these receptors are useful as information to provide perspective for the risk manager and compliance with Agency guidance (USEPA, 1995a).

Site 10 The CT carcinogenic risk results for potential future residential receptors are presented in Tables C-51 and C-55 in Appendix C of this report. The CT aggregate residential risk is 7×10^{-6}, which exceeds the residential Florida target risk level. The CT aggregate trespasser risk is 5×10^{-7}, which is below the Florida target risk level. The hypothetical future occupational worker CT risk is 8×10^{-7}. The risk ranges presented by the RME and CT exposure scenarios for potential future residential receptors are useful information to provide perspective for risk management and compliance with USEPA guidance (USEPA, 1995a).

6.7 REMEDIAL GOAL OPTIONS (RGOs). RGO tables are presented for each medium with a total excess lifetime cancer risk (ELCR) greater than 1×10^{-4} or an HI greater than 1 per USEPA guidance, and for media with chemicals whose estimated risk exceed Florida target risk level. The RGO concentrations are calculated using the scenario representing the highest estimated risk for a given medium. Based on the above criteria, RGOs are developed for each chemical with a total ELCR greater than 1×10^{-6} or an HQ greater than 0.1. Analytes whose EPCs exceed Florida standards are also presented in the RGO tables.

RGOs, available Federal regulatory guidance, and FDEP risk-based criteria are intended to provide the basis for the development of remedial alternatives in the FS. The RGO values are not actual or proposed cleanup levels, but are provided to assist risk-management decision making in the FS.

Surface Soil. RGOs are presented for arsenic based on cancer risk for the resident (adult and child) at Site 9. RGOs are presented for aluminum, antimony, arsenic, chromium, iron, and vanadium based on noncancer risk for the child resident at Site 9. Table 6-17 presents the RGOs for these analytes.

RGOs are presented for benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, Aroclor-1254, and arsenic based on cancer risk to the resident (adult and child) at Site 10. RGOs are presented for Aroclor-1254, aluminum, arsenic, iron, and total petroleum hydrocarbons based on noncancer risks for the child resident

Table 6-17
Summary of Remedial Goal Options for Surface Soil, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (based on risk to resident adult and child)			Total Hazard Index (based on risk to child resident)			Florida Cleanup Target Level (residential)[1]	Florida Cleanup Target Level (leaching)[1]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Inorganic Analytes (mg/kg)											
Aluminum	17,500 to 29,300	29,300	NA	NA	NA	NR	NR	7,510	75,000	NC	16,200
Antimony	8.3	8.3	NA	NA	NA	NR	NR	1.6	26	NC	7.9
Arsenic	2.8 to 10.1	10.1	NR	4.1	0.41	NA	NA	NA	0.8	NC	3.2
Chromium	14.9 to 46.2	46.2	NA	NA	NA	NR	NR	35.5	290	NC	11.2
Iron	12,300 to 29,9800	29,800	NA	NA	NA	NR	15,700	1,570	NA	NC	9.47
Vanadium	32.2 to 76.7	76.7	NA	NA	NA	NR	NR	43	490	NC	22.1

[1] Values are from Florida Department of Environmental Protection, Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.

Notes: mg/kg = milligrams per kilogram.
NA = not applicable.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NC = not calculated.

at Site 10. RGOs for benzo(a)anthracene and indeno(1,2,3-c,d)pyrene are presented because they exceed the Florida SCTL. Table 6-18 presents the RGOs for these analytes.

Groundwater. RGOs are presented for arsenic based on cancer risks for the child resident at Site 9. Table 6-19 presents the RGOs for these analytes.

<u>6.8 SUMMARY OF HHRA FOR SITE 9 AND SITE 10</u>. HHCPCs were identified and risks were estimated for surface soil and groundwater associated with Site 9. HHCPCs were identified and risks were estimated for surface soil associated with Site 10. No HHCPCs were found in subsurface soil and groundwater at Site 10, and no further evaluations were performed. The following conclusions were drawn based on this HHRA:

- The HHCPCs detected in surface soil, subsurface soil, groundwater, and surface water do not pose unacceptable carcinogenic risks to the receptors at Site 9 or Site 10 based on evaluation of the samples using USEPA guidelines and target risk range. Noncarcinogenic risks with an HI greater than 1 were identified for a total child resident exposure to surface soil at Sites 9 and 10.

- The total ELCR at Site 9, associated with exposure to soil by a hypothetical future resident (3×10^{-5}) exceeded Florida's target risk level of concern 1×10^{-6} due to arsenic; and may therefore pose an unacceptable risk. The HI of 4 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1, due to iron, antimony, arsenic, and aluminum.

- The total ELCR at Site 10, associated with exposure to soil by a potential future resident (5×10^{-5}), occupational worker (3×10^{-6}), and a trespasser (3×10^{-6}) did meet or exceed Florida's target risk level of (1×10^{-6}) (due to carcinogenic PAH and arsenic). The HI of 3 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1 due to iron, aluminum, arsenic, TPH, and Aroclor-1254.

- The background levels of arsenic at Site 9 and Site 10 exceed Florida SCTLs and result in an unacceptable carcinogenic risk.

- Groundwater at Site 9 may pose an unacceptable risk due to arsenic although the risk does not exceed the USEPA target risk range.

- Surface water at Site 9 associated with incidental ingestion and dermal contact while wading does not pose an unacceptable cancer or noncancer risk based on USEPA and FDEP target thresholds.

Table 6-18
Summary of Remedial Goal Options for Surface Soil, Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (based on risk to resident adult and child)			Total Hazard Index (based on risk to child resident)			Florida Cleanup Target Level (residential)[1]	Florida Cleanup Target Level (leaching)[1]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Semivolatile Organic Compounds (μg/kg)											
Benzo(a)anthracene	42 to 1,400	190	NR	NR	700	NA	NA	NA	1,400	2,900	NA
Benzo(a)pyrene	45 to 2,500	1310	NR	700	70	NA	NA	NA	100	7,800	NA
Benzo(b)fluoranthene	62 to 2,500	142	NR	NR	700	NA	NA	NA	1,400	9,800	NA
Dibenzo(a,h)anthracene	178 to 1,000	347	NR	NR	70	NA	NA	NA	100	14,000	NA
Indeno(1,2,3-cd)pyrene	57 to 3,200	854	NR	NR	700	NA	NA	NA	1,500	28,000	NA
Pesticides (μg/kg)											
Aroclor-1254	51 to 365	365	NR	NR	65	NR	NR	140	600	6,200	NA
Inorganic Analytes (mg/kg)											
Aluminum	7,425 to 37,000	24,343	NA	NA	NA	NR	NR	7,380	72,000	NC	12,700
Arsenic	2.55 to 8.8	6.4	NR	4	0.4	NR	NR	2.3	0.8	NC	3.13
Iron	6,650 to 23,800	17,501	NA	NA	NA	NR	15,900	1,590	23,000	NA	8,830
Vanadium	18.8 to 63.4	45.2	NA	NA	NA	NR	NR	41	15	NC	21.8
Total Petroleum Hydrocarbons (μg/kg)											
Total Petroleum Hydrocarbons	3,300 to 666,000	666,000	NA	NA	NA	NR	NR	215,000	350	NC	NA

[1] Values are from Florida Department of Environmental Protection, Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.

Notes: mg/kg = milligrams per kilogram.
NA = not applicable.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
NC = not calculated.
μg/ℓ = micrograms per kilogram.

Table 6-19
Summary of Remedial Goal Options for Groundwater, Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Range of Detected Concentrations	Exposure Point Concentration	Total Excess Lifetime Cancer Risk (based on risk to resident adult and child)			Total Hazard Index (based on risk to child resident)			Florida Cleanup Target Level[1]	Federal MCL[2]	Background Screening Concentration
			10^{-4}	10^{-5}	10^{-6}	3	1	0.1			
Inorganic Analytes ($\mu g/\ell$)											
Aluminum	107 to 3,720	1,310	NA	NA	NA	NA	NA	NA	200	50	654
Arsenic	2.7 to 3.6	2.2	NR	NR	0.3	NA	NA	NA	50	50	ND

[1] Values are from Florida Department of Environmental Protection, Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.
[2] Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from February 1996.

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
NA = not applicable.
NR = not reported because the calculated remedial goal option exceeds the exposure point concentration.
ND = not detected in any background sample.

7.0 ECOLOGICAL RISK ASSESSMENT

The ERA evaluates potential adverse effects to ecological receptors associated with exposure to chemicals from Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A). The ERA for Sites 9 and 10 follows the methodologies described in the NAS Whiting Field GIR (HLA, 1998), and current guidance materials for ERAs at Superfund sites, including the following:

- *Risk Assessment Guidance for Superfund: Environmental Evaluation Manual* (USEPA, 1989b)
- *Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference* (USEPA, 1989c)
- *Framework for Ecological Risk Assessment* (USEPA, 1992b)
- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (USEPA, 1997c)
- Supplemental Guidance to RAGS: Region IV Bulletins on Ecological Risk Assessment (USEPA, 1995c)
- *Proposed Guidelines for Ecological Risk Assessment* (USEPA, 1996b)

Risk assessment guidance included in the USEPA "Eco Update" bulletins (1991c, 1992c, and 1992d) and recent publications (e.g., Maughan, 1993; Suter, 1993) were also consulted.

This ERA was conducted to determine if ecological receptors are potentially exposed to contaminants from Sites 9 and 10 at concentrations that could cause adverse effects. The ERA for Sites 9 and 10 consists of eight sections:

- Site Characterization (Section 7.1) describes current ecological conditions at the sites;
- Problem Formulation (Section 7.2) establishes the goals and focus of the assessment and identifies major factors to be considered;
- Hazard Assessment and Selection of ECPCs (Section 7.3) reviews the analytical data and identifies chemicals present at the sites that may pose ecological risks;
- Exposure Assessment (Section 7.4) identifies complete exposure pathways and quantifies the magnitude and frequency of exposure;
- Ecological Effects Assessment (Section 7.5) identifies potential adverse effects to ecological receptors associated with the chemicals of concern identified in Section 7.3;
- Risk Characterization (Section 7.6) integrates exposure and concentration-toxicity response information to derive a likelihood estimate of adverse effects;

- Uncertainties (Section 7.7) identifies assumptions of the ERA process that may influence the risk assessment conclusions; and

- Summary of Ecological Risks (Section 7.8) summarizes risk evaluation data.

__7.1 SITE CHARACTERIZATION__. As shown on Figure 1-2, Sites 9 and 10 are located along the eastern facility boundary near the southern east-west runway. The area forming Sites 9 and 10, which is approximately 6 acres in size, was originally a single borrow pit. A description of the historical and current conditions at Sites 9 and 10 are provided in Subsections 7.1.1 and 7.1.2, respectively. Additional information is provided in Chapter 2.0 of this document.

__7.1.1 Site 9, Waste Fuel Disposal Pit__ Site 9 is approximately 2 acres in size and occupies the northern end of the borrow pit. Anecdotal evidence suggests that during the 1950s and 1960s a tank truck was used to transport waste fuel oil to the area for disposal.

Site 9 slopes from the land surface topographic high on the site's northwest side toward the lowest excavated area located within the eastern half of the site. Although the depression remains dry for most of the year, standing water may accumulate in this area to form an ephemeral pond following periods of heavy rain. The ephemeral pond, which remains dry for much of the year, does not provide suitable habitat for aquatic receptors. However, terrestrial mammals and birds may use any surface water as a drinking water source including the water in this ephemeral pond. The ephemeral pond is approximately 0.1 acre in size.

Figure 7-1 depicts the major vegetative cover groups at Site 9. The vegetative community at Site 9 is primarily characterized as planted pine. The pine trees are random, and widely spaced trees consist mostly of longleaf pine *(Pinus palustris)*. Many trees are mature (sizes range from 6 to 12 inches in diameter) and appear healthy, except for a few trees, which are physically damaged as a result of high winds during the 1995 hurricanes of Elena and Opal. There are several oak (*Quercus* spp.) and pine saplings and a young gallberry (*Ilex coriacea*) present at the site. The understory consists of broomsedge (*Andropogon* sp.), dog fennel (*Eupatorium capillifolium*), golden aster (*Pityopsis graminifolia*), greenbrier (*Smilax* sp.), verbena (*Verbena officinalis*), bracken fern (*Pteridium aquilinum*), lespedeza (*Lespedeza stuevii*), and Jacquemontia (*Jacquemontia tamnifolia*). An ephemeral pond, surrounded by a sedge and grass community, has developed in the lowest portions of the site. Also, a sparse vegetative area exists in the northeastern portion of the site, possibly due to the presence of an iron-sandstone-like material at the surface. This hard, rock-like material, may be physically more difficult for plants to colonize than other areas at Site 9.

Sites 9 and 10 are predominantly surrounded by planted pine forest and maintained grass fields that are part of the runway system. NAS Whiting Field maintains an ecosystem management program for planting and harvesting of longleaf and slash pine (*P. palustris* and *P. elliotii*, respectively), including controlled burns and timber harvesting activities. As part of the ecosystem management plan, planted pine forests undergo periodic burning, usually once every 4 years, and selective thinning of trees every 8 to 10 years. These forestry management activities

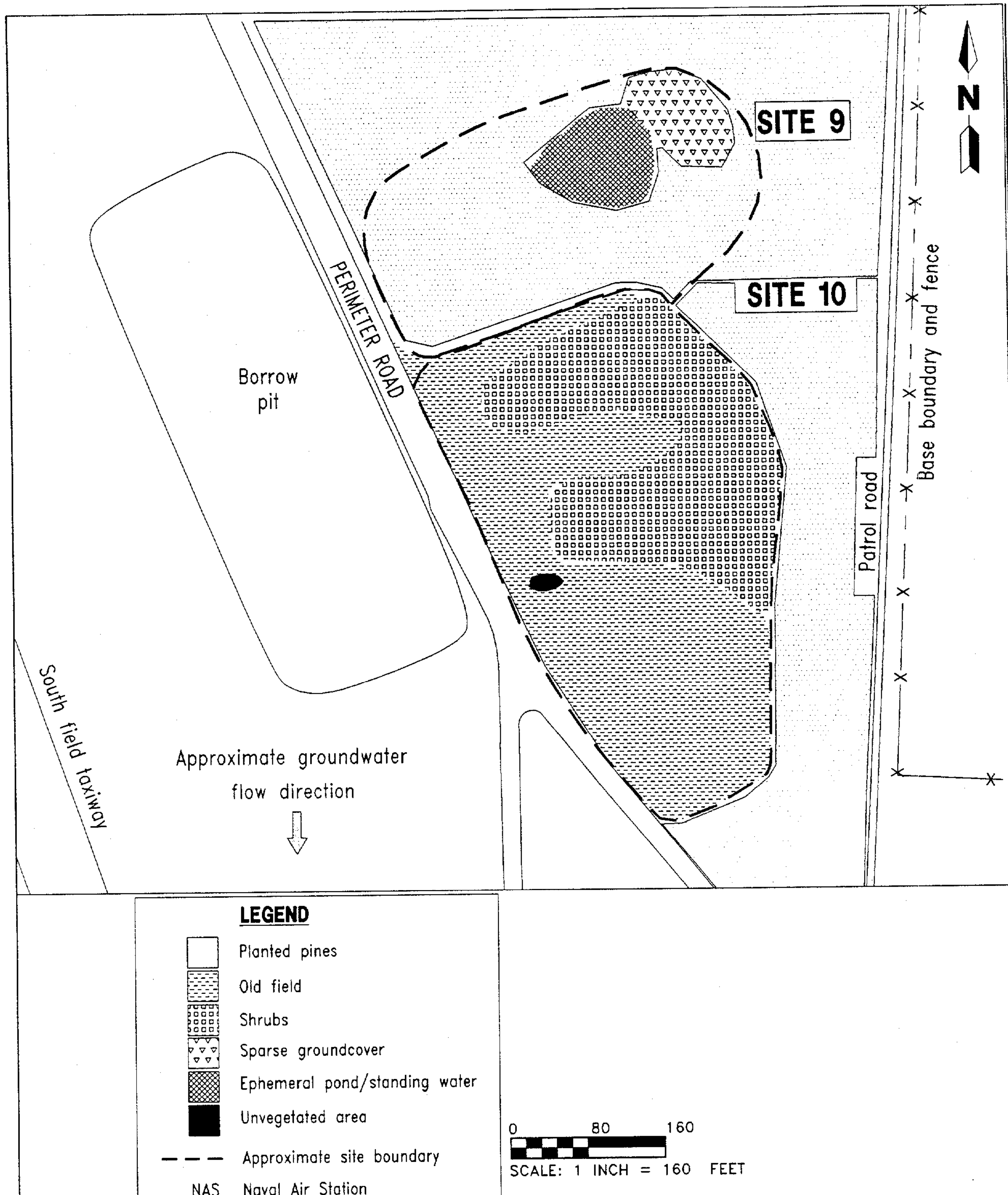

FIGURE 7-1
VEGETATIVE COVER MAP

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REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAS WHITING FIELD
MILTON, FLORIDA

provide a variety of habitats and food sources. The planted pine areas of Site 9 and those surrounding Site 10 are reaching a mature status with a well-developed canopy and an open understory typical of upland pine forests of the southeastern United States.

Southeastern United States pine forests provide habitat for a diverse array of birds, including insectivorous gleaners of pine needles and bark, flycatchers, seed-eaters, and nocturnal and diurnal aerial predators (Wolfe et. al., 1988). The pine flatwoods near Sites 9 and 10 are likely to host such an assemblage of species. Birds of prey, such as owls and hawks, may also nest in these wooded areas.

It is likely that the plant and terrestrial invertebrate biomass at Site 9 serve as a forage base for a variety of wildlife species, including adult amphibians, reptiles, small birds, and small mammals. Small reptiles, mammals, and birds may forage open areas and return to forested areas for protection. Predatory birds and mammals inhabiting the surrounding pine flatwoods areas may also be attracted to the sites' open areas. The adjacent forested area is sufficiently large to provide cover and feeding habitat for larger predatory animals (e.g., foxes, owls, and hawks).

Mammals that may occur in pine flatwoods include the eastern cottontail rabbit (*Sylvilagus floridanus*), the hispid cotton rat (*Sigmodon hispidus*), cotton mouse (*Peromyscus gossypinus*), armadillo (*Dasypus novemcinctus*), and white-tailed deer (*Odocoileus virginianus*). Predatory mammals and birds such as the red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), great horned owl (*Bubo virginianus*), and red-tailed hawk (*Buteo jamaicensis*) may feed on small mammals and birds occurring in these environments.

Chemicals from Sites 9 and 10 may potentially migrate into the groundwater and discharge into tributaries leading to Coldwater Creek (located approximately 4,000 feet downgradient and southeast of the site). Groundwater discharge to surface water is not evaluated as part of the ERA because Coldwater Creek receives groundwater discharge and storm water runoff from multiple sources of potential contamination at NAS Whiting Field. In addition, chemical concentrations detected in Site 9 groundwater are low and are not likely to be a concern for current and future discharges to surface water. Table 5-14 presents the analytical results for groundwater samples collected at Site 9. 2-Butanone (2 $\mu g/\ell$) was the only organic compound detected in groundwater from Site 9. The majority of inorganic constituents were detected at concentrations below the background screening values. Background screening values are equal to two times the average detected inorganic concentration in background samples and are presented in Section 3.3 of the GIR (HLA, 1998). Only two nonnutrient inorganics (aluminum and vanadium) were detected in both groundwater and surface soil samples at maximum detected concentrations greater than two times background. Additional information on the groundwater sampling and results is provided in Section 5.7 of this document.

<u>7.1.2 Site 10, Southeast Open Disposal Area (A)</u> The southern 4 acres of the borrow pit were filled to form Site 10. From 1965 to 1973, the Site 10 portion of the borrow pit was used for the disposal of inert wastes such as construction debris, trees, brush, metal cans, and similar materials not suitable for landfill disposal. Transformer oil and empty pesticide and herbicide containers were also reportedly disposed of at the site. Currently, the site has been backfilled to

the natural surface level with only a few concrete rubble piles extending above the ground level.

The major vegetative cover groups at Site 10 are also depicted on Figure 7-1. The vegetative community at Site 10 is best characterized as old field community dominated by graminoids and other herbaceous plants. Several mature trees are located around the site perimeter, but only saplings and shrubs are located within the refuse portions of the site. Trees and shrubs observed at Site 10 included longleaf pine (*P. palustris*), mimosa (*mimosa strigillosa*), willow (*Salix nigra*), blueberry (*Vaccinium* sp.), yaupon holly (*Ilex vomitoria*), and Chinese privet (*Ligustrum sinense*). Groundcover plants include some grasses (centipede grass, bahia grass, panic grass), sedges such as broomsedge (*Andropogon* sp.), and woody and herbaceous perennials such as ageratum (*Conoclinnium coelestinum*), agalinis (*Agalinis setacea*), bladder-pod (*Glottidium vesicarium*), blazing star (*Liatris chapmanii*), cudweed (*Gnaphalium pensylvanicum*), dog fennel (*Eupatorium capillifolium*), golden aster (*Pityopsis graminifolia*), goldenrod (*Solidago* sp.), Japanese honeysuckle (*Lonicera japonica*), lantana (*Lantana* sp.), Mexican clover (*Richardia brasiliensis*), moss verbena (*Glandularia pulchella*), ragweed (*Ambrosia* sp.), and rattle box (*Crotalaria lanceolata*). A small vegetatively bare area (approximately 15 to 20 feet across) is located on the western side of the site. Changes in vegetative cover are likely associated with surface soil variability in the soil character. Soil in the area that is devoid of vegetation has more clay and appears harder than the surrounding area, suggesting that the lack of vegetative cover may be the result of physical limitations rather than from the site-related contamination.

Although Site 10 is best characterized as overgrown field, the planted pine and maintained grass areas surrounding the site are similar to those occurring at or near Site 9. Given the similarity of surrounding habitat and the close proximity of Sites 9 and 10, it is expected that the wildlife species identified in Subsection 7.1.1 may also occur at Site 10.

Although no aquatic habitat is present at Site 10, groundwater from the site may also discharge to Coldwater Creek. As previously discussed in Subsection 7.1.1, groundwater discharge to surface water is not evaluated as part of the ERA for Site 10 because Coldwater Creek receives groundwater discharge and storm water runoff from multiple sources of potential contamination at NAS Whiting Field. In addition, chemical concentrations detected in Site 10 groundwater are low and are not likely to be a concern for current and future discharges to surface water. Table 5-17 presents the analytical results for groundwater samples collected at Site 10. One organic (bis[2-ethylhexyl]phthalate at 2 $\mu g/\ell$) and three nonnutrient inorganics (barium, manganese, and zinc) were detected in both the surface soil and groundwater at Site 10. However, the maximum detected concentrations of barium, manganese, and zinc in groundwater were less than their respective background screening concentrations. Additional information on the groundwater sampling and results is presented in Section 5.7 of this document.

<u>7.2 PROBLEM FORMULATION</u>. The problem formulation is the initial step of the ERA process. Problem formulation is composed of identification of receptors, identification of exposure pathways for those receptors, and selection of assessment and measurement endpoints based on information gathered from the site characterization.

7.2.1 Identification of Receptors Ecological receptors that may potentially use the planted pine forest of Site 9 and the old field habitat of Site 10 include terrestrial wildlife (i.e., mammal, birds, reptiles, and adult amphibians), terrestrial plants, and soil invertebrates. Terrestrial flora and fauna potentially using NAS Whiting Field are identified in the GIR (HLA, 1998). Aquatic receptors are not evaluated in the ERA because no aquatic habitat exists at Sites 9 and 10.

Certain species that potentially reside at NAS Whiting Field are protected by Federal and/or State laws. A list of State and federally protected species is provided in the GIR (HLA, 1998). No State or federally listed rare, threatened, or endangered species or species of concern are known or likely to inhabit Sites 9 and 10.

7.2.2 Identification of Exposure Pathways Exposure pathways are identified for three groups of receptors (terrestrial wildlife, terrestrial plants, and soil invertebrates). A complete exposure pathway includes a source of contamination, an exposure route, and a receptor. Conceptual models of the exposure pathways, from source to ecological receptors at Sites 9 and 10, are depicted in the contaminant pathway models on Figures 7-2 and 7-3, respectively.

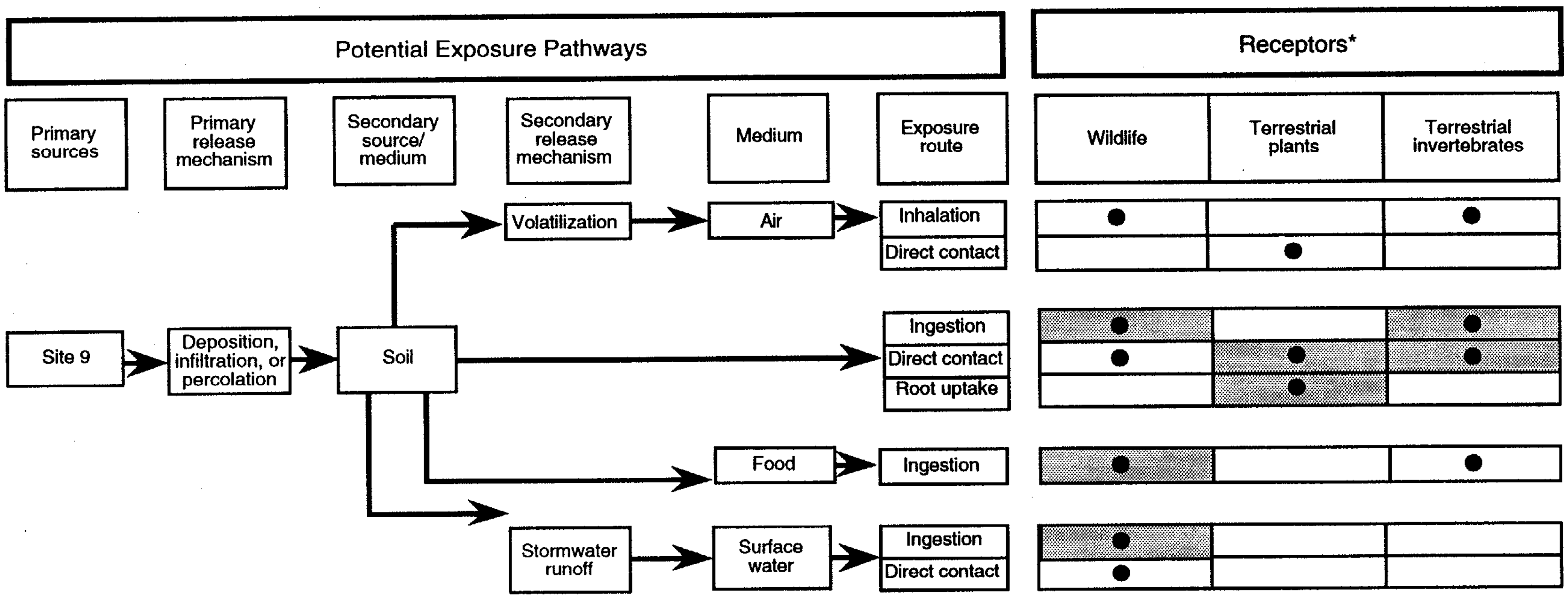
All potential routes of exposure are considered in the ERA and are presented in the contaminant pathway model. The model differentiates between those exposure routes that are quantitatively evaluated and those that are qualitatively discussed. This limitation is necessary to focus the risk evaluation on those pathways for which contaminant exposures are the highest and most likely to occur. Those pathways that cannot be quantitatively evaluated, due to a lack of toxicological information, are qualitatively discussed and addressed as uncertainties. The general approach used to identify exposure pathways for the three groups of receptors is explained below.

Terrestrial Wildlife. Terrestrial wildlife may be exposed to contaminants in surface soil, surface water, and food items contaminated as a result of ingestion, dermal adsorption, and inhalation of fugitive dust and volatile emissions.

The drinking water exposure pathway is expected to occur only occasionally, following periods of heavy rain. However, it is assumed that the surface water at Site 9 is used as a primary drinking water source for terrestrial wildlife throughout the year. Since the depression remains dry for most of the year, aquatic organisms are not expected to be present. Therefore, ingestion of aquatic food items (i.e., fish and invertebrates) by terrestrial organisms are not evaluated in the ERA. The ERA will evaluate only exposures to surface soil and potentially contaminated food from Sites 9 and 10 and exposure to drinking water at Site 9.

Dermal adsorption is considered a negligible exposure pathway because the presence of fur, feathers, or chitinous exoskeleton is likely to prevent contamination from coming in direct contact with the skin (personal communication with Ted Simon, USEPA Region 4, September 1997). In addition, soil trapped in the fur or feathers is likely to be ingested during grooming or preening activities, which are evaluated as part of the direct ingestion exposure pathway.

Exposure via inhalation of fugitive dust is also not likely to be a significant exposure pathway because the vegetation at Sites 9 and 10 would limit the release



NOTES:
ERA = ecological risk assessment
OU = operable unit

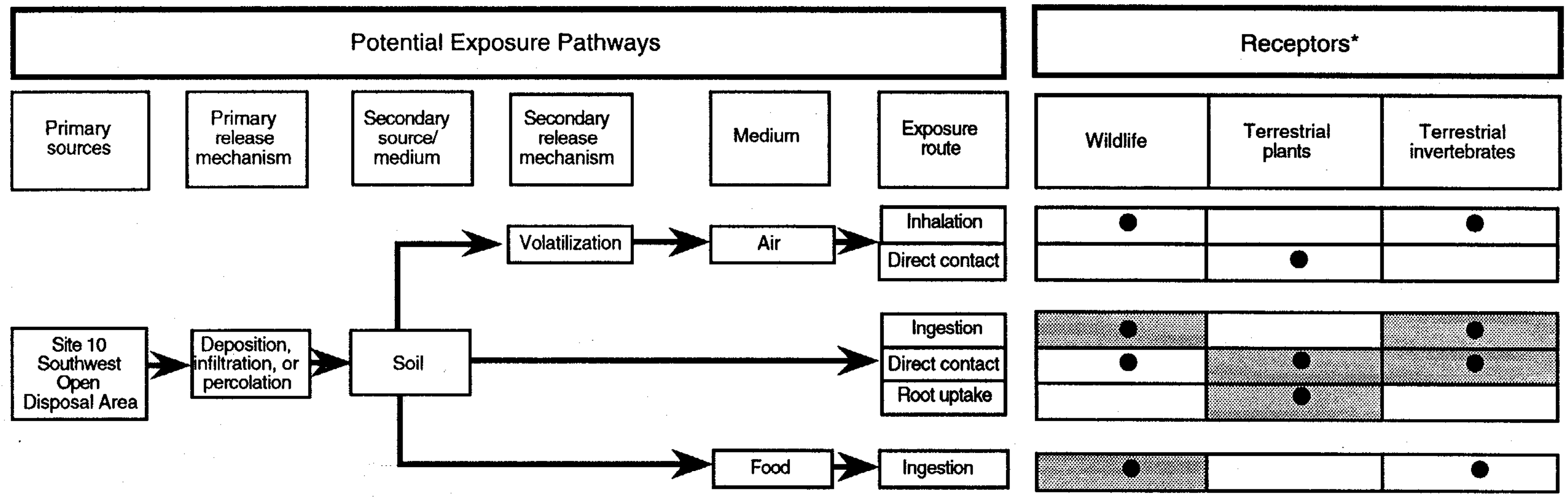
* Shading indicates the exposure pathways that are quantitatively evaluated for receptors in Site 9 ERA. Nonshaded pathways are evaluated qualitatively, not evaluated due to the lack of toxicity information, or not evaluated because it is not considered a significant pathway.

FIGURE 7-2
CONTAMINANT PATHWAY MODEL FOR SITE 9 ECOLOGICAL RECEPTORS

REMEDIAL INVESTIGATION REPORT SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

2534-09 WHITING RI 9/10 FIG 7-2 011398MAW



NOTES:
ERA = ecological risk assessment

* Shading indicates the exposure pathways that are quantitatively evaluated for receptors in the Site 10 ERA. Nonshaded pathways are not evaluated because they are not considered significant pathways.

FIGURE 7-3
CONTAMINANT PATHWAY MODEL FOR SITE 10 ECOLOGICAL RECEPTORS

REMEDIAL INVESTIGATION REPORT SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

2534-09 WHITING RI 9/10 FIG 7-3 FINAL 011398MAW of fugitive dust. Although volatile contaminants were detected in the surface soil at Site 10 (but not at Site 9), exposures associated with VOCs are not evaluated because only two volatiles (2-hexanone at 2.75 μg/kg and xylene at 1 μg/kg) were detected at low frequency and concentration. Also, no burrowing animals were observed at Site 10 during the site characterization.

Potential contaminant exposures for reptiles and amphibians exist at NAS Whiting Field; however, ingestion toxicity data and bioaccumulation factors (BAFs) are generally not available for these receptors. Therefore, potential risks associated with ingestion of affected media and food to these reptiles and amphibians will be qualitatively addressed in the Uncertainties Section (Section 7.7)of the ERA.

Terrestrial Plants and Invertebrates. Terrestrial plants and soil invertebrates may be exposed to contamination in surface soil by direct contact with and root uptake (plants) or ingestion (invertebrates) of soil. The ingestion exposure routes include the ingestion of soil and food items containing chemicals accumulated from Sites 9 and 10 surface soil. Because the depth to groundwater is 60 to 100 feet bls, it is unlikely that terrestrial plant roots will reach a zone of saturation.

7.2.3 Identification of Endpoints The assessment and measurement endpoints selected for Sites 9 and 10 ERAs are listed in Table 7-1. Assessment endpoints represent the ecological component to be protected, whereas the measurement endpoints approximate or provide a measure of the achievement of the assessment endpoint. The assessment endpoint selected for the Sites 9 and 10 ERAs are the survival and maintenance of receptor populations and communities occurring at these sites. The measurement endpoints used to gauge the likelihood of population- and community-level effects for Site 9 are chemical-specific toxicological benchmark values derived from the literature that are based on laboratory-measured survival, growth, and reproductive effects. For terrestrial plants and invertebrates at Site 10, the assessment endpoint is measured by the survival and growth of earthworms (*Eisenia foetida)* and germination of lettuce seeds (*Lactuca sativa)* in tests using surface soil samples from Site 10. Table 7-1 presents the assessment endpoint, endpoint species, measurement endpoint, and decision point (i.e., the level at which additional evaluation is warranted).

Four hypotheses were developed to gauge potential risks associated with exposure to Sites 9 and 10 surface soil. These hypotheses are designed for multiple species and trophic levels and represent both individual and community dynamics. Hypotheses for the Sites 9 and 10 ERA include the following:

1. Are ecological chemicals of potential concern (ECPCs) present in the surface soil at concentrations sufficiently high to reduce plant or soil invertebrate biomass or plant cover availability such that small mammal and bird populations could be affected?

2. Are ECPCs present in the surface soil at concentrations sufficiently high to reduce the survivability and growth of terrestrial plants and soil invertebrates?

3. Are ECPC concentrations in plants and invertebrates sufficiently high as to adversely affect foraging by small mammal or bird populations following consumption of contaminated prey?

Table 7-1
Endpoints Selected for Ecological Risk Assessment, Sites 9 and 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Assessment Endpoint	Receptor	Measurement Endpoint	Decision Point
Reduction in biomass of terrestrial plants used as forage material at Site 9.	Terrestrial plants	Chemical concentrations (mg/kg) detected in surface soil samples from Site 9 that result in adverse effects on growth, reproduction, or survival of terrestrial plants.	The reasonable maximum exposure concentration (mg/kg) of an ECPC in surface soil from Site 9 is greater than the terrestrial plant RTV.
Survival and growth of plant communities at Site 10.		Germination of lettuce seeds exposed to surface soil samples from Site 10 in laboratory toxicity tests.	Significant differences ($p \leq 0.05$) in germination of lettuce seeds exposed to Site 10 surface soil samples as compared to control samples.
Reduction in the abundance of earthworms used as forage material at Site 9.	Terrestrial invertebrates	Chemical concentrations (mg/kg) detected in surface soil samples from Site 9 that result in adverse effects on survival (i.e., LC_{50} studies) or measured adverse effects on reproduction and growth to terrestrial invertebrates.	The reasonable maximum exposure concentration (mg/kg) in surface soil from Site 9 is greater than the terrestrial invertebrate RTV.
Survival and growth of terrestrial invertebrate communities.		Survival and growth of earthworms exposed to surface soil samples from Site 10 in laboratory toxicity tests.	Significant differences ($p \leq 0.05$) in survival and/or growth of earthworms exposed to Site 10 surface soil samples as compared to control samples.
Survival and maintenance of wildlife populations.	Wildlife species	Oral chemical doses (mg/kg BW/day) based on measured adverse effects on growth, reproduction, or survival (i.e., NOAEL, LOAEL, and LD_{50} studies) of mammalian or avian laboratory test populations.	Comparison of potential dietary exposures in mammalian and avian wildlife with literature-derived RTVs. (HQ >1 indicates potential risks.)

Notes: mg/kg = milligrams per kilogram.
BW/day = body weight per day.
LD_{50} = lethal dose to 50 percent of a test population.
LC_{50} = lethal concentration to 50 percent of a test population.
HQ = hazard quotient.
RTV = reference toxicity value.
NOAEL = no observed adverse effect level.
LOAEL = lowest observed adverse effect level.
ECPC = ecological chemical of potential concern.
$\leq$ = less than or equal to.
$>$ = greater than.

4. Are bioaccumulating chemicals sufficiently high to reduce survivability, growth, or reproduction in top predators (i.e., foxes and owls)?

<u>7.3 HAZARD ASSESSMENT AND SELECTION OF ECPCS</u>. The hazard assessment includes a review of analytical data and selection of ECPCs. ECPCs represent analytes detected in environmental media (i.e., surface soil) that are considered in the ERA and could present a potential risk for ecological receptors. The process for selecting ECPCs is depicted on Figure 7-4. Additional details regarding the ECPC selection process are provided in Subsection 2.4.2 of the GIR (HLA, 1998). Analytical data for Sites 9 and 10 were evaluated for use in risk assessment pursuant to national guidance, *Guidance for Data Useability in Risk Assessment (Parts A and B)* (USEPA, 1992a).

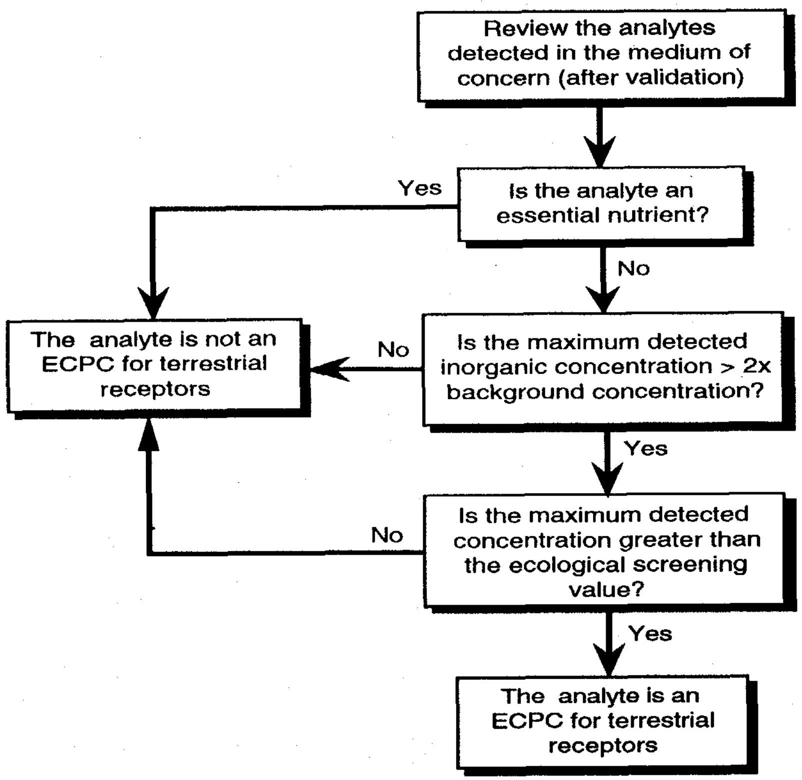
Calcium, magnesium, potassium, and sodium are excluded as ECPCs for surface water. In addition to these analytes, iron is also excluded as an ECPC for surface soil. These analytes are considered to be essential nutrients and not toxic. The rationale for eliminating essential nutrients as ECPCs is provided in the GIR (HLA, 1998).

Inorganic chemicals representative of background conditions are not selected as ECPCs. In accordance with USEPA Region IV guidance (USEPA, 1991d), an inorganic analyte is not selected as an ECPC if the maximum detected concentration is less than two times the average detected inorganic concentration in background samples. The maximum detected concentrations are compared against representative site-specific background surface soil screening concentrations to eliminate chemicals that are unlikely to be site related.

A site-specific surface soil background investigation was conducted at NAS Whiting Field, and the findings are presented in Paragraph 3.3.1.1 of the GIR (HLA, 1998). The site-specific background study used to establish background screening values for Sites 9 and 10 surface soil consists of eight surface soil samples (BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501) and a duplicate sample (BKS00201D) collected from areas containing Troup loamy sand soil. Background surface water data for Site 9 is not available. The surface water at Site 9 is an isolated water body that was created as a result of excavation activities. Neither the Coldwater Creek, Clear Creek, nor ponds in the area are similar to the ephemeral pond at Site 9.

Analytes that exceed the background screening concentrations and are not essential nutrients are compared against ecological screening values for surface soil. The surface soil ecological screening values are the Dutch Soil Criteria "A", which refer to background concentrations in surface soil issued by the U.S. Fish and Wildlife Service (Beyer, 1990). If the maximum detected concentration of an analyte exceeds the ecological screening value, the analyte is retained as an ECPC for terrestrial wildlife, which also includes terrestrial plants and soil invertebrates.

Analytes in surface water samples are typically screened against surface water background, when available, to eliminate chemicals that are unlikely to be site related. However, background surface water is unavailable for the ephemeral pond at Site 9. Concentrations of analytes detected in surface water are screened against USEPA Region 4 Freshwater Surface Water Chronic Screening Values



NOTES:
ECPC = ecological chemical of potential concern
> = greater than
x = times

FIGURE 7-4
ECOLOGICAL CHEMICAL OF POTENTIAL CONCERN SELECTION PROCESS

REMEDIAL INVESTIGATION REPORT SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)

NAVAL AIR STATION WHITING FIELD MILTON, FLORIDA

2534-09 WHITING RI 9/10 FIG 7-4 FINAL 011398MAW

(USEPA,1995c). A discussion of the ECPCs selected at Sites 9 and 10 is presented below in Subsections 7.3.1 and 7.3.2, respectively.

7.3.1 Site 9 Five surface soil samples (09S00101, 09S00201, 09S00301, 09S00401, and 09S00501) and one duplicate sample (09S00301D) were collected at Site 9. In addition, one surface water sample and a duplicate (09W00101 and 09W00101D) were collected from the ephemeral pond at Site 9. Tables 7-2 and 7-3 present a summary of the respective surface soil and surface water analytical data and the following information: frequency of detection, range of detection limits, range of detected concentrations, average of detected concentrations, background screening concentrations, ecological screening values, and selected ECPCs.

ECPCs selected for surface soil samples collected at Site 9 include two semivolatiles (1,2,4-trichlorobenzene, 1,4-dichlorobenzene) and three inorganics (aluminum, antimony, and vanadium). Three inorganics (aluminum, iron, and manganese) were retained as ECPCs in surface water at Site 9.

7.3.2 Site 10 Eleven surface soil samples (10-SL-01, 10-SL-02, 10-SL-03, 10-SL-04, 10-SL-05, 10S00101, 10S00201, 10S00301, 10S00401, 10S00501, and 10S00601) and two duplicate samples (10S00101D, and 10S00201D) were collected at Site 10 (see Figures 2-2 and 3-2).

Table 7-4 presents a summary of the surface soil analytical data from Site 10 including the following information: frequency of detection, range of detection limits, range of detected concentrations, average of detected concentrations, background screening concentrations, ecological screening values, and selected ECPCs. ECPCs selected for surface soil collected at Site 10 include 27 constituents: one VOC (2-hexanone), 19 semivolatiles (14 PAHs; butylbenzlphthalate, diethylphthalate, bis(2-ethylhexyl)phthalate, carbazole, and dibenzofuran), two PCBs (Aroclor-1254 and Aroclor-1260), four inorganics (aluminum, cadmium, vanadium, and zinc), and TRPH.

7.4 EXPOSURE ASSESSMENT. The purpose of the ecological exposure assessment is to estimate or measure the amount of an ECPC to which an ecological receptor may be exposed. The following sections briefly describe how contaminant exposures are estimated or measured for wildlife, terrestrial plants, and invertebrates at Sites 9 and 10. The contaminant pathway models (Figures 7-2 and 7-3) provide a summary of the potential exposure pathways that exist at Sites 9 and 10 for each group of receptors. Additional details regarding the exposure assessment are provided in the GIR (HLA, 1998).

7.4.1 Calculation of Exposure Point Concentrations The EPC is a representative concentration used for evaluating risks throughout this ERA. RME and CT concentrations are derived for each ECPC. If the sample size is greater than or equal to 10, the RME value is equal to the lesser of the maximum detected concentration and the 95th percent UCL calculated on the log-transformed arithmetic mean (USEPA, 1992e). The calculation of the 95th percent UCL uses one-half of the detection limit as a surrogate value for samples where no analyte concentration was detected. If the sample size is less than or equal to nine, the RME concentration is equal to the maximum detected concentration.

If potential risks are predicted based on the RME scenario, then the CT exposure scenario is also evaluated. The CT exposure concentration is represented by the

Table 7-2
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Range of Reporting Limits	Range of Detected Concentration[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern	Average of All Samples[6]	Exposure Point Concentration RME[7]	Exposure Point Concentration CT[8]
Semivolatile Organic Compounds (μg/kg)										
1,2,4-Trichlorobenzene	1/5	370 to 470	110	110	ND	50	Yes	180	110	110
1,4-Dichlorobenzene	1/5	370 to 470	120	120	ND	50	Yes	182	120	120
Inorganic Analytes (mg/kg)										
Aluminum	4/5	40	17,500 to 29,300	25,438	15,848	NSC	Yes	20,354	29,300	20,354
Antimony	1/5	12	8.3	8.3	8	NSC	Yes	6.5	8.3	6.5
Arsenic	5/5	2	2.8 to 10.1	7	3.2	20	No[9]			
Barium	4/5	40	5.5 to 15.3*	10	23.2	200	No[9,10]			
Beryllium	4/5	1	0.08 to 0.17*	0.13	0.36	NSC	No[10]			
Calcium	1/5	1,000	442*	442	396	NSC	No[11]			
Chromium	4/5	2	14.9 to 46.2	29.5	11	100	No[9]			
Cobalt	1/5	10	0.535*	0.54	3	20	No[9,10]			
Copper	4/5	5	4.5 to 7.5	6.1	9.4	50	No[9,10]			
Iron	4/5	20	12,300 to 29,800	22,038	8,832	NSC	No[11]			
Lead	5/5	0.6	3.1 to 12.3	7.1	11.4	50	No[9]			
Magnesium	4/5	1,000	73.3 to 185*	127	268	NSC	No[10,11]			
Manganese	4/5	3	10.1 to 40.55*	23.5	392	NSC	No[10]			
Mercury	4/5	0.1	0.01 to 0.03	0.02	0.12	0.5	No[9,10]			
Nickel	3/5	8	2.9 to 5.05*	4	7.2	50	No[9,10]			
Potassium	1/5	1,000	356*	356	177	NSC	No[11]			
Vanadium	4/5	10	32.2 to 76.7	57	21.8	NSC	Yes	46.6	76.7	46.6
Zinc	3/5	4	3.8 to 10.35*	7	15.4	200	No[9,10]			

See notes on following page.

Table 7-2 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the contract-required quantification limit/contract required detection limit is used as a surrogate concentration for the nondetect values.
[3] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. Background screening values for organic analyte are one times the average of detected concentrations. Organic values are included for comparison purposes only (i.e., not used to select ECPCs).
[5] The ecological screening values are the Dutch Soil Criteria "A" as reported in the U.S. Fish and Wildlife Service, Biological Report 1990(2), "Evaluating Soil Contamination," (Beyer, 1990).
[6] The average of all samples assigns a value of one-half of the contract required quantification limit/contract required detection limit as a surrogate concentration for samples where no concentration was reported (nondetect values).
[7] The RME concentration is equal to the maximum detected concentration.
[8] The CT concentration is equal to the lesser of the average of all samples and the maximum exposure point concentration.
[9] The maximum detected concentration is less than the ecological screening concentration. Therefore, the analyte will not be evaluated further.
[10] The maximum detected concentration is less than the background screening concentration. Therefore, the analyte will not be evaluated further.
[11] Analyte is an essential nutrient, and not considered toxic. Therefore, the analyte will not be evaluated further.

Notes: The average of a sample and its duplicate is used for all table calculations.
Samples: 09S00101, 09S00201, 09S00301, 09S00401, and 09S005101
Duplicate samples: 09S00301D
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501
Background duplicate samples: BKS00201D

* = average of a sample and its duplicate.
μg/kg = micrograms per kilogram.
NSC = no screening concentration available.
mg/kg = milligrams per kilogram.
RME = reasonable maximum exposure.
ND = not detected in any background sample.
CT = central tendency.

Table 7-3
Selection of Ecological Chemicals of Potential Concern for Surface Water Associated with Site 9

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Ecological Screening Value[3]	Chemical of Ecological Concern
Volatile Organic Compounds ($\mu g/\ell$)					
Toluene	1/1	10	3*	175	No[4]
Inorganic Analytes ($\mu g/\ell$)					
Aluminum	1/1	200	126*	NSC	Yes
Arsenic	1/1	10	2.8*	190	No[4]
Calcium	1/1	5,000	743*	NSC	No[5]
Iron	1/1	100	111.5*	NSC	Yes
Magnesium	1/1	5,000	235*	NSC	No[5]
Manganese	1/1	15	12.1*	NSC	Yes
Potassium	1/1	5,000	305.5*	NSC	No[5]
Sodium	1/1	5,000	898.5*	NSC	No[5]

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the non-detect values.
[3] The ecological screening values are the chronic freshwater screening concentrations from the USEPA Region 4 Bulletin for Ecological Risk Assessment (USEPA, 1995c).
[4] The maximum detected concentration is less than the ecological screening concentration. Therefore, the analyte will not be evaluated further.
[5] Analyte is an essential nutrient and not considered toxic. Therefore, the analyte will not be evaluated further.

Notes: The average of a sample and its duplicate is used for all table calculations.

Sample: 09W00101
Duplicate sample: 09W00101D

$\mu g/\ell$ = micrograms per liter.
* = average of a sample and its duplicate.
NSC = no screening concentration available.

Table 7-4
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern	95th % UCL[6]	Average of All Samples[7]	Exposure Point Concentration	
										RME[8]	CT[9]
Volatiles Organic Compounds (µg/kg)											
2-Hexanone	1/11	11 to 12	4.75*	4.8	ND	NSC	Yes	NC	5.5	4.75	4.75
Xylenes (total)	1/11	5 to 12	1	1	ND	50	No[10]				
Semivolatile Organic Compounds (µg/kg)											
Acenaphthene	2/11	350 to 1,600	110 to 115*	113	ND	[11]100	Yes	308	226	115	115
Anthracene	3/11	350 to 1,600	122* to 227.5*	183	ND	100	Yes	317	239	227.5	227.5
Benzo(a)anthracene	8/11	350 to 1,600	42 to 1,400	380	ND	[11]100	Yes	1,086	327	1,086	327
Benzo(a)pyrene	6/11	350 to 1,600	45 to 2,500	627	ND	100	Yes	1,313	425	1,313	425
Benzo(b)fluoranthene	8/11	350 to 1,600	62 to 2,500	550	ND	[11]100	Yes	1,422	450	1,422	450
Benzo(g,h,i) perylene	2/11	350 to 1,600	260* to 3,800	2030	ND	[11]100	Yes	854	520	854	520
Benzo(k)fluoranthene	7/11	350 to 1,600	62 to 2,300	532	ND	[11]100	Yes	1,054	405	1,054	405
Butylbenzylphthalate	4/11	350 to 1,600	40 to 123.5*	73.6	ND	NSC	Yes	399	200	123.5	123.5
Carbazole	[14]3/6	365 to 1,600	137* to 160	147	ND	[11]100	Yes	NC	268	160	160
Chrysene	9/11	350 to 1,600	40 to 1,600	395	ND	[11]100	Yes	1,394	357	1,394	357
Dibenzo(a,h)anthracene	2/11	185 to 380	177.5* to 1,000	589	ND	[11]100	Yes	347	258	347	258
Dibenzofuran	1/11	350 to 1,600	52	52	ND	NSC	Yes	358	228	52	52
Diethylphthalate	1/11	350 to 1,600	96	96	ND	NSC	Yes	317	233	96	96
Fluoranthene	8/11	350 to 1,600	59 to 1,480*	551	ND	100	Yes	1,525	451	1,480	451
Fluorene	1/11	350 to 1,600	120	120	ND	[11]100	Yes	317	234	120	120
Indeno(1,2,3-cd)pyrene	4/11	350 to 1,600	57* to 3,200	919	ND	[11]100	Yes	854	451	854	451
Phenanthrene	6/11	350 to 1,600	36 to 740*	301	ND	100	Yes	916	305	740	305
Pyrene	9/11	350 to 1,600	45 to 1,800	503	ND	100	Yes	1,998	445	1,800	445
bis(2-Ethylhexyl)-phthalate	7/11	350 to 1,600	57 to 1,720*	350	ND	NSC	Yes	781	347	781	347

See notes at end of table.

Table 7-4 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 10

Remedial Investigation
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern	95th % UCL[6]	Average of All Samples[7]	Exposure Point Concentration	
										RME[8]	CT[9]
Pesticides and PCBs (μg/kg)											
4,4'-DDD	1/11	3.6 to 170	4.4	4.4	ND	100	No[10]				
4,4'-DDT	7/11	3.8 to 170	2.1 to 35	17	ND	100	No[10]				
Aroclor-1254	5/11	36 to 1,700	51 to 365*	229	ND	50	Yes	416	141	365	141
Aroclor-1260	2/11	36 to 1,700	49 to 60	54.5	ND	50	Yes	369	128	60	60
Dieldrin	1/11	3.6 to 170	19	19	ND	100	No[10]				
Heptachlor	1/11	1.9 to 86	5.2	5.2	ND	100	No[10]				
Heptachlor epoxide	1/11	1.9 to 86	2.4	2.4	ND	100	No[10]				
alpha-Chlordane	2/11	1.9 to 860	1.1 to 5.2	3.2	ND	100	No[10]				
gamma-Chlordane	1/11	1.9 to 860	6.4	6.4	ND	100	No[10]				
Inorganic Analytes (mg/kg)											
Aluminum	11/11	40 to 40	7,425* to 37,000	16,673	15,848	NSC	Yes	24,343	16,673	24,343	16,673
Arsenic	11/11	2 to 2	2.55* to 8.8	4.8	3.2	20	No[10]				
Barium	11/11	40 to 40	7.5 to 190.5*	30.9	23.2	200	No[10]				
Beryllium	9/11	0.09 to 1	0.08* to 0.315*	0.17	0.36	NSC	No[12]				
Cadmium	7/11	0.9 to 1	0.5 to 2.4	1.3	0.58	1	Yes	1.6	0.99	1.6	0.99
Calcium	11/11	1,000 to 1,000	157 to 20,500*	2,629	396	NSC	No[13]				
Chromium	11/11	2 to 2	10.1 to 31.9	19.3	11	100	No[10]				
Cobalt	10/11	10 to 10	0.805* to 2.4	1.5	3	20	No[10,12]				
Copper	10/11	5 to 5	5.2 to 24.2	11.3	9.4	50	No[10]				
Cyanide	5/11	0.24 to 0.5	0.11 to 0.165*	0.14	0.28	NSC	No[12]				
Iron	11/11	20 to 20	6,650* to 23,800	13,130	8,832	NSC	No[13]				
Lead	11/11	0.6 to 1	8.6 to 47.8	27.2	11.4	50	No[10]				
Magnesium	11/11	1,000 to 1,000	77.7 to 5,755*	676	268	NSC	No[13]				
Manganese	11/11	3 to 3	13.1 to 389	84.4	392	NSC	No[12]				

See notes at end of table.

Table 7-4 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection[1]	Reporting Limit Range	Detected Concentration Range[2]	Average of Detected Concentrations[3]	Background Screening Concentration[4]	Ecological Screening Value[5]	Chemical of Ecological Concern	95th % UCL[6]	Average of All Samples[7]	Exposure Point Concentration	
										RME[8]	CT[9]
Inorganic Analytes (mg/kg) (continued)											
Mercury	5/11	0.08 to 0.14	0.01 to 0.2	0.08	0.12	0.5	No[10]				
Nickel	7/11	2.3 to 8	3* to 7	4.9	7.2	50	No[10,12]				
Potassium	5/11	129 to 1,000	70.5 to 359.5*	225	177	NSC	No[13]				
Selenium	1/11	0.4 to 1	0.29	0.29	0.46	NSC	No[12]				
Sodium	8/11	1,000 to 1,000	160 to 387	237	406	NSC	No[12,13]				
Thallium	1/11	0.44 to 2	0.13	0.13	1.16	NSC	No[12]				
Vanadium	11/11	10 to 10	18.8* to 63.4	33.8	21.8	NSC	Yes	45.2	33.8	45.2	33.8
Zinc	10/11	4 to 4	11.2 to 705	104	15.4	200	Yes	567	95.1	567	95.1
Total Petroleum Recoverable Hydrocarbons (mg/kg)											
TRPH	[15]3/3	1.8 to 1.8	3.3 to 666	252	NA	1	Yes	NC	252	666	252

See notes on following page.

Table 7-4 (Continued)
Selection of Ecological Chemicals of Potential Concern for Surface Soil Associated with Site 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Frequency of detection is the number of samples in which the analyte was detected in relation to the total number of samples analyzed (excluding rejected values).
[2] The value indicated by an asterisk is the average of a sample and its duplicate. For duplicate samples having one nondetect value, one-half of the contract-required quantification limit/contract-required detection limit is used as a surrogate concentration for the non-detect values.
[3] The average of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples with "R", "U", or "UJ" validation qualifiers.
[4] The background screening value is twice the average of detected concentrations for inorganic analytes in background samples. Background screening values for organic analyte are one times the average of detected concentrations. Organic values are included for comparison purposes only (i.e., not used to select ECPC).
[5] The ecological screening values are the Dutch Soil Criteria "A" as reported in the U.S. Fish and Wildlife Service, Biological Report 1990(2), "Evaluating Soil Contamination," (Beyer, 1990).
[6] The 95th percent upper confidence limit (UCL) is calculated on the log-transformed average of all samples using the formula provided in the USEPA "Supplemental Guidance to RAGS: Calculating the Concentration Term." The 95 percent UCL is not calculated when there are less than 10 total samples (USEPA, 1992e).
[7] The average of all samples assigns a value of one-half of the contract-required quantification limit/contract-required detection limit as a surrogate concentration for samples where no concentration was reported.
[8] The reasonable maximum exposure (RME) concentrations is equal to the lesser of the maximum detected concentration or the 95th percent UCL.
[9] The central tendency (CT) concentration is equal to the lesser of the average of all samples and the maximum exposure point concentration.
[10] *The maximum detected concentration is less than the ecological screening concentration. Therefore, the analyte will not be evaluated further.*
[11] Ecological screening value for this PAH is not available; the ecological screening concentration for benzo(a)pyrene is used as a surrogate.
[12] The maximum detected concentration is less than the background screening concentration. Therefore, the analyte will not be evaluated further.
[13] Analyte is an essential nutrient, and not considered toxic. Therefore, the analyte will not be evaluated further.
[14] *Five of the carbazole analytical results were rejected, and thus, not included in the frequency of detection.*
[15] TRPH analysis was performed on three samples only.

Notes: The average of a sample and its duplicate is used for all table calculations.

Samples: 10-SL-01, 10-SL-02, 10-SL-03, 10-SL-04, 10-SL-05, 10S00101, 10S00201, 10S00301, 10S00401, 10S00501, and 10S00601
Duplicate samples: 10S00101D and 10S00201D
Background samples: BKG-SL-02, BKG-SL-06, BKG-SL-07, BKG-SL-08, BKS00101, BKS00201, BKS00401, and BKS00501
Background duplicate samples: BKS00201D

* = analyte of a sample and its duplicate.
UCL = upper confidence level, see footnote 5.
μg/kg = micrograms per kilogram.
NSC = no screening concentration available.
PCB = polychlorinated biphenyl.
DDT = dichlorodiphenyltrichloroethane.
RME = reasonable maximum exposure.
CT = central tendency.
% = percent.
ND = not detected in any background sample.
NC = not calculated.
DDD = dichlorodiphenyldichloroethane.
mg/kg = milligrams per kilogram.

arithmetic mean of all samples. One-half of the detection limit is also used as a surrogate value for sample results that are below the detection limit. Tables 7-2 through 7-4 present the RME and CT EPCs for selected ECPCs identified at Sites 9 and 10.

<u>7.4.2 Terrestrial Wildlife</u> Exposure routes for wildlife receptors include direct ingestion of surface soil and surface water (for Site 9 only)and indirect exposure through ingestion of food containing site-related chemicals. The actual amount of an ECPC taken in by wildlife species (i.e., ingestion dose in mg/kg-day) depends on a number of factors. A potential dietary exposure (PDE) model is used to estimate exposure to representative wildlife species. The PDE (or body dose) is calculated for each ECPC using the equations presented in Table 7-5 and the methodologies described in the GIR (HLA, 1998).

Body dose is calculated using the PDE model for several wildlife species from different trophic guilds that may be present at the sites. The model uses species-specific feeding and habitat characteristics to estimate chemical exposures to wildlife species respective to their position in the food chain. Terrestrial receptors were chosen to represent the trophic levels typically found in disturbed overgrown fields and pine forest habitats present at Sites 9 and 10. The representative wildlife species considered in the ERA for Sites 9 and 10 are summarized in Table 7-6 and discussed below.

- **Cotton mouse** (*Peromyscus gossypinus*). The cotton mouse represents a small mammalian herbivore that could potentially be exposed to contamination in soil and in plant tissue (accumulated from the soil). The cotton mouse home range is estimated at 0.147 acre and could reside entirely on Sites 9 and 10. The cotton mouse represents the small mammal herbivore community at Sites 9 and 10.

- **Short-tailed shrew** (*Blarina brevicauda*). The short-tailed shrew finds suitable habitat in forests, fields, marshes, and brush. It primarily feeds on earthworms, snails, centipedes, insects, small vertebrates, and slugs (DeGraaf and Rudis, 1986). Insectivorous species may receive relatively high chemical doses of bioaccumulating compounds as a result of their voracious appetites. The shrew represents small omnivorous mammals that may be found in the pine forest of Site 9 and the old field portions of Site 10.

- **Eastern meadowlark** (*Sturnella magna*). The eastern meadowlark is most commonly found in open pastures, prairies, farms, and meadows and has a home range of approximately 5 acres. The meadowlark feeds primarily on invertebrates, although its diet is supplemented with plants. The meadowlark represents insectivorous avian receptors found in open areas of Sites 9 and 10 (DeGraaf and Rudis, 1986).

- **Mourning dove** (Zenaida macroura). The mourning dove forages by ground-gleaning on roadsides and open fields with scattered shrubs and trees. It feeds almost entirely on seeds; however, it is known to eat occasional insects, snails, and structures, and its estimated home range is 5 acres. The dove represents herbivorous avian receptors at Sites 9 and 10.

- **Red fox** (*Vulpes vulpes*). This omnivorous mammal prefers open woodlands and grassy fields and is most active at night and twilight. It is an

Table 7-5
Estimation of Potential Chemical Exposures for Representative Wildlife Species

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Estimation of Chemical Exposures Related to Surface Soil

Scope: Estimates the amount (dose) of a chemical ingested and accumulated by a species via incidental ingestion of surface soil and food items containing site-related chemicals.

Soil Chemical Concentration: The maximum detected concentration of the ecological chemicals of potential concern (ECPCs) when the sample size is ≤ 9, and the lesser of the maximum detected concentration or the 95th percent upper confidence limit (UCL) when the sample size is ≥ 10.

Soil Exposure Concentration:

$$\begin{matrix}\textit{Soil} \\ \textit{Exposure} \\ (mg/kg)\end{matrix} = \left(\begin{matrix}\textit{\% of Diet} \\ \textit{as Soil}\end{matrix} \times \begin{matrix}\textit{Soil} \\ \textit{Concentration} \\ (mg/kg)\end{matrix} \right)$$

Primary Prey Item Concentration (T_N)

$$\begin{matrix}\textit{Primary} \\ \textit{Prey Item} \\ \textit{Concentration} \\ (mg/kg)\end{matrix} = \left(BAF_{\textit{inv or plant}} \times \begin{matrix}\textit{Soil} \\ \textit{Concentration} \\ (mg/kg)\end{matrix} \right)$$

Secondary Prey Item Concentration (T_N):

$$\begin{matrix}\textit{Secondary} \\ \textit{Prey Item} \\ \textit{Concentration} \\ (mg/kg)\end{matrix} = \left(BAF_{\textit{mam or bird}} \times \begin{matrix}\textit{Tissue} \\ \textit{Concentration of} \\ \textit{Primary} \\ \textit{Prey Items}^{*} \\ (mg/kg)\end{matrix} \right)$$

where BAF = Bioaccumulation Factor or mg/kg fresh weight tissue over mg/kg dry weight soil for invertebrates and plants, and mg/kg fresh weight tissue over mg/kg fresh weight food for small mammals and small birds.

* For a discussion of the weighted chemical concentration in prey items, see explanation of the PDE term below, and the GIR (HLA, 1998).

Total Exposure Related to Surface Soil:

$$\begin{matrix}PDE \\ (mg/kgBW\text{-}day)\end{matrix} = \frac{\left[P_1 \times T_1 + \ldots + P_N \times T_N + \begin{matrix}\textit{soil} \\ \textit{exposure}\end{matrix}\right] \times IR_{Diet} \times SFF \times ED}{BW}$$

where
- PDE = Potential Dietary Exposure (mg/kg BW-day),
- P_N = percent of diet composed of food item N,
- T_N = tissue concentration in food item N (mg/kg),
- IR_{Diet} = food ingestion rate of receptor (kg of food or dietary item per day),
- BW = body weight (kg) of receptor,
- SFF = Site Foraging Frequency (site area [acres] divided by home range [acres]), assumed to be equal to 1 for lethal exposure scenario, and
- ED = Exposure Duration (fraction of year species is expected to occur on site.

See notes at end of table.

Table 7-5 (Continued)
Estimation of Potential Chemical Exposures for Representative Wildlife Species

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Estimation of Chemical Exposures Related to Surface Water

Description:	Estimates the amount of a chemical ingested and accumulated by a species resulting from incidental ingestion of surface water .
Chemical Concentration:	Same procedure as described above for soil .
Surface Water Exposure:	

$$\underset{(mg/day)}{\textit{Surface Water Exposure}} = \frac{\left(\underset{(\ell/day)}{IR_{SW}} \times \underset{(mg/\ell)}{\textit{Surface Water Concentration}} \right)}{BW} \qquad (6)$$

Where IR_{sw} = water ingestion rate of receptors (liters of water per day)

Notes: mg/kg = milligrams per kilogram.
kg/day = kilograms per day.
kg = kilogram.
% = percent.
mg/kg BW-day = milligrams per kilogram of body weight per day.
$\leq$ = less than or equal to.
$\geq$ = greater than or equal to.
inv = invertebrate species.
mam = mammal species.
BAF = bioaccumulation factor.
mg/day = milligrams per kilogram.
ℓ/day = liters per day.
mg/ℓ = milligrams per liter.

Table 7-6
Ecological Receptors Evaluated for Sites 9 and 10

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Receptor Evaluated		Method of Evaluation
Common Name	Scientific Name	
Terrestrial plant	Lettuce (*Lactuca sativa*)	Benchmark comparison (Site 9). Toxicity testing using lettuce seed germination (Site 10).
Terrestrial invertebrate	Earthworm (*Eisenia foetida*)	Benchmark comparison (Site 9). Toxicity testing using earthworms (Site 10).
Cotton mouse	*Peromyscus gossypinus*	Food-web model
Short-tailed shrew	*Blarina brevicauda*	Food-web model
Eastern meadowlark	*Sturnella magna*	Food-web model
Mourning dove	*Zenaida macroura*	Food-web model
Red fox	*Vulpes vulpes*	Food-web model
Great horned owl	*Bubo virginianus*	Food-web model

opportunistic forager, feeding on small mammals, birds, amphibians, reptiles, invertebrates, berries, and other fruits (Burt and Grossenheider, 1976). The red fox has an estimated home range of approximately 250 acres and represents the large predatory mammal guild at Sites 9 and 10.

- **Great horned owl** (*Bubo virginianus*). The great horned owl is primarily a nocturnal hunter of small mammals. Its habitat includes deep woods and heavily wooded swamps often near open country where it may hunt for primary prey items consisting of small mammals and birds (DeGraaf and Rudis, 1986). The great horned owl home range is approximately 15 acres. The owl represents the predatory avian carnivores of both the open and forested areas of Sites 9 and 10.

Parameters for quantitatively evaluating exposures to wildlife include body weight, food ingestion rate, home range, and relative consumption of food items. Exposure assumptions for each of the representative wildlife species for Sites 9 and 10 are provided in Table 7-7 and in Tables D-6, D-13 and D-17 of Appendix D. In addition to these parameters, the species foraging habits and bioaccumulation in food items are also considered.

The Site Foraging Frequency (SFF) considers the frequency a receptor feeds within the site area by estimating the acreage of the site relative to the receptor's home range and by considering the fraction of the year the receptor would be exposed to site-related chemicals. By definition the SFF cannot exceed 1. Sites 9 and 10 (approximately 2 and 4 acres, respectively) are larger than the home range for the cotton mouse and short-tailed shrew and smaller than the home range for the eastern meadowlark, red fox, and great horned owl. Because all representative wildlife species are expected to actively forage at the site year round, it is assumed that the exposure durations for these organisms are 1.

Table 7-7
Exposure Parameters for Representative Wildlife Species

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Representative Wildlife Species	Body Weight (kg)	Reported Diet	Assumed Diet for Terrestrial Exposure Assessment (% of diet)	Food Ingestion Rate (kg/day)	Water Ingestion Rate (l/day)	Home Range (acres)
Cotton mouse [a] (*Peromyscus gossypinus*)	0.021 [b]	Seeds and some insects. [c]	88% Plants 10% Invertebrates 2% Soil [d]	0.0029 [e]	0.003 [f]	0.147 [g]
Short-tailed shrew (*Blarina brevicauda*)	0.017 [h]	Earthworms, slugs & snails, fungi, insects, and vegetation. [c]	78% Invertebrates 12% Plants 10% Soil [c]	0.0024 [e]	0.0025 [f]	0.96 ± 0.09 [c]
Eastern meadowlark (*Sturnella magna*)	0.087 [i]	Insects, weed seeds and grass seeds, 75% of diet is invertebrates (beetles, grubs, bugs, grasshoppers, crickets, ants, and spiders. [i]	75% Invertebrates 20% Plants 5% Soil [i]	0.0119 [l]	0.0115 [k]	5 [i]
Mourning dove (*Zenaida macroura*)	0.13[i]	Seeds, waste grains from agriculture, some insects, and occasionally snails. [j]	94% Plants 1% Invertebrates 5% Soil [i]	0.0154 [l]	0.015 [k]	5 [j]
Red fox (*Vulpes vulpes*)	4.69 [c]	Small mammals, birds, and invertebrates, as well as berries and other fruits. [c]	57% Small mammals 20% Invertebrates 10% Small birds 10% Plants 3% Soil [c]	0.24 [e]	0.398 [f]	250 [c]
Great horned owl (*Bubo virginianus*)	1.50 [j]	Mostly rabbits, mice, rats, squirrels, birds. bats, snakes, frog, crayfish and grasshoppers. [j]	80% Small mammals 19% Birds 1% Soil [c]	0.078 [l]	0.077 [k]	15 [m]

See notes on following page.

Table 7-7 (Continued)
Exposure Parameters for Representative Wildlife Species

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References:
[a] Values for the deer mouse were used for the cotton mouse (U.S. Environmental Protection Agency [USEPA], 1993).
[b] Average of adult male and female deer mice in North America (USEPA, 1993b).
[c] Wildlife Exposure Factors Handbook (USEPA, 1993b).
[d] Deer mouse value used for cotton mouse based on similarities in diet. Other values were based on diet composition (USEPA 1993b).
[e] Calculated using the mammal equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = 0.0687 x Wt $^{0.822}$ (kg) (USEPA, 1993b).
[f] Water ingestion rate for mammals is based on body weight in kg: water ingestion (l/day) = 0.099 x Wt $^{0.9}$ (kg) (USEPA, 1993b).
[g] Average for male and female deer mice, Virginia/mixed deciduous forest (USEPA, 1993b).
[h] Mean of means reported for male and female shrews in summer and fall (USEPA, 1993b).
[i] Terres (1991).
[j] DeGraaf & Rudis (1986).
[k] Water ingestion rate for birds is based on body weight in kg: water ingestion (l/day) = 0.059 x Wt $^{0.67}$ (kg) (USEPA, 1993b).
[l] Calculated using the bird equation based on body weight (Wt.) in kg. Food ingestion (kg/day) = 0.0582 x Wt $^{0.651}$ (kg) (USEPA, 1993b).
[m] Great horned owl home range taken from low end of range in SE Madison County, N.Y. Hager (1957).

Notes: kg = kilogram.
% = percent.
± = plus or minus.
kg/day = kilograms per day.

Wildlife species may be exposed to ECPCs in surface soil and surface water via incidental ingestion or by ingestion of prey items that have bioaccumulated these ECPCs. A PDE model is used to estimate the dose received by each representative wildlife species for each ECPC in all media according to the equations in Table 7-5 and the methodologies described in Subsection 2.4.3 of the GIR (HLA, 1998).

BAFs are used in the wildlife PDE model to estimate the transfer of chemicals between soil and plants or soil invertebrates, and between these organisms and primary consumer species. To estimate the PDE, tissue concentrations of ECPCs in prey items are estimated using BAFs. BAFs for invertebrate and plant food items are defined as the ratio of the ECPC concentration in plant or invertebrate tissue (mg chemical/kg tissue wet-weight) to the ECPC concentration in surface soil (mg chemical/kg dry-weight soil). BAFs reported in the scientific literature for avian and mammalian receptors are the reported ratios of ECPC concentrations in the tissues of these receptors (mg chemical/kg tissue wet-weight) to the concentrations of ECPCs in their food items (mg chemical/kg tissue wet-weight). BAFs for most receptors are extrapolated from literature values or estimated using regression equations from scientific literature. Based on the evidence provided in several reference materials (Suter, 1993; Maughan, 1993), an assumption is made that VOCs do not bioaccumulate in prey tissue. The general approach used to select BAFs for Sites 9 and 10 are summarized in Table 7-8. BAFs for each of the surface soil ECPCs evaluated at Sites 9 and 10 are included in Table D-1 of Appendix D.

<u>7.4.3 Terrestrial Plants and Invertebrates</u> Terrestrial plants and invertebrates may be exposed to ECPCs via direct contact with and root uptake (plants) or ingestion (invertebrates) of ECPCs measured in Sites 9 and 10 surface soil. For the purposes of the Sites 9 and 10 ERA, exposures to terrestrial plants and invertebrates are assumed to occur within the top 1 foot interval of surface soil. Exposure of terrestrial plants to groundwater is not evaluated because the depth to the water table is approximately 60 to 100 feet bls (see hydrogeological discussion in Chapter 5.0 of this report).

<u>7.5 ECOLOGICAL EFFECTS ASSESSMENT</u>. The ecological effects assessment discusses what measurement endpoints were used to evaluate potential adverse impacts to the assessment endpoints (i.e., the maintenance of receptor populations). The methods used for identifying and characterizing ecological effects for ECPCs in surface soil are described in the following subsections and in greater detail in Subsection 2.4.4 of the GIR (HLA, 1998).

Wildlife receptors, terrestrial plants, and terrestrial invertebrates are potentially exposed to ECPCs in surface soil and surface water at Site 9 and surface soil at Site 10. The measures of adverse ecological effects for these receptors are discussed separately.

<u>7.5.1 Terrestrial Wildlife</u> As identified in the problem formulation, the assessment endpoint selected for terrestrial wildlife is the survival and maintenance of wildlife populations and communities within the habitats present at Sites 9 and 10. Because no long-term wildlife population data are available at NAS Whiting Field, a direct measurement of this assessment endpoint is not possible. The literature-derived results of laboratory toxicity studies that relate the dose of a chemical in an oral exposure with an adverse response to growth, reproduction, or survival of a test population (avian or mammalian

Table 7-8
Estimation of Bioaccumulation Factors

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Receptor Group	Nature of Approach	General Approach
Terrestrial Plants		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature Values	When available, literature values were used to estimate plant BAFs.
	SAR	When literature values were not available, plant BAFs for semivolatile organic compounds (SVOCs) were calculated using a regression equation based on the relationship between plant bioconcentration factors and the n-octanol-water partition coefficient for soil (K_{ow}s) of analytes (Travis and Arms, 1988).[1] The study found that bioconcentration factors for vegetation are inversely proportional to the square root of the K_{ow}s of an analyte.
	Extrapolation and Empirical Data	When literature values were not available, plant BAFs for inorganic compounds were obtained from Baes et al. (1984).[1]
	Assumption	Although evidence suggests that plants may transport organic analytes with log K_{ow}s < 5 (i.e., volatile organic compounds [VOCs]) from the roots into leafy portions (Briggs et al., 1982; Briggs et al., 1983), bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that transfer of VOCs from plant tissue to animal tissue does not occur.
Terrestrial Invertebrates		
Unit: mg/kg wet tissue per mg/kg dry soil	Literature Values	When no site-specific values were available, literature values were used to estimate BAFs for invertebrates.
	Assumption	Bioaccumulation data for VOCs is generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that soil invertebrates do not bioaccumulate VOCs.

See notes at end of table.

Table 7-8 (Continued)
Estimation of Bioaccumulation Factors

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Receptor Group	Nature of Approach	General Approach
Small Mammals		
Unit: mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small mammals.
	SAR	When literature values were not available for SVOCs, BAFs for small mammals were estimated using a regression equation based on the uptake of organic chemicals into beef tissue from Travis and Arms (1988)[3].
	Extrapolation and Empirical Data	When literature values were not available, BAFs for small mammals for inorganics were derived from ingestion-to-beef biotransfer factors (BTFs) presented in Baes et al. (1984)[2].
	Assumption	Bioaccumulation data for VOCs are generally lacking in the scientific literature. In addition, evidence in the literature (Suter, 1993; Maughan, 1993) suggests that analytes with log K_{ow}s < 3.5 are not bioaccumulated into animal tissue. Therefore, it was assumed that small mammals do not bioaccumulate VOCs.
Small Birds		
Unit: mg/kg wet tissue per mg/kg wet food	Literature Values	When available, literature values were used to estimate BAFs for small birds.
	No Information	BAFs were not obtained for SVOCs or for inorganic compounds as there is little bioaccumulation data available for birds. It was assumed that small birds do not accumulate VOCs.

[1] BAFs derived from Baes et al. (1984). Values are based on analysis of literature references, correlations with other chemical and physical parameters, or comparisons of observed and predicted elemental concentrations in vegetative and reproductive plant material and soil. Data are based on dry weight and were converted to a fresh weight basis assuming that plants are 80 percent water. This is generally consistent with the water content of berries (82 to 87 percent water) and leafy vegetables (87 to 95 percent water), presented in Suter (1993). Grains contain a much lower percentage of water (approximately 10 percent); therefore, this assumption likely underestimates exposure to graminivores.

[2] BTFs were converted to a BAF (mg/kg tissue divided by mg/kg food) by multiplying by a food ingestion rate of 12 kg (dry weight) per day (average intake for lactating and nonlactating cattle reported in Travis and Arms, 1988).

Notes: mg/kg = milligrams per kilogram.
BAF = bioaccumulation factor.
VOC = volatile organic compound.
Log K_{ow} = *Logarithmic expression of the octanol-water partition coefficient.*
< = less than.
BTF = biotransfer factor.

species) are used as a measure of the assessment endpoint. Table D-2 in Appendix D presents wildlife ingestion toxicity data found in the literature.

Reference toxicity values (RTVs) are derived for each surface soil and surface water ECPC and representative wildlife species according to the data hierarchy presented in *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (USEPA, 1997c). The RTV represents the lowest exposure level (e.g., concentration in the diet normalized by dividing by the body-weight) shown to produce adverse effects (e.g., reduced growth, impaired reproduction, increased mortality). For each ECPC, two RTVs representing lethal and sublethal effects are selected for each representative wildlife species. Lethal effects are those that result in mortality while sublethal effects are those that impair or prevent reproduction or growth. The RTVs are assumed to be a measure of the assessment endpoints for the protection of the survival, growth, and reproduction of terrestrial wildlife populations. Lethal RTVs are developed using the following data hierarchy discussed in items 1, 2, and 3 below, while sublethal RTVs are derived using the methodology discussed in items 1 and 2:

1. For contaminants with well-documented adverse effects, the highest exposure level that is a no-observed-adverse-effect level (NOAEL) is selected as the RTV.

2. If a NOAEL value is not available, one-tenth of the lowest-observed-adverse-effect level (LOAEL) is selected as the RTV.

3. If an NOAEL or LOAEL value is not available, the lowest reported oral dose (in mg/kg body weight-day) lethal to 50 percent of a test population LD_{50} is used to derive the lethal RTV. The lethal RTV is one-fifth of the lowest reported LD_{50} value for the species most closely related to the representative wildlife receptor. One-fifth of an oral LD_{50} value is considered to be protective against lethal effects for 99.9 percent of individuals in a test population (USEPA, 1986b). An assumption is made that the value represented by one-fifth of an oral LD_{50} would be protective of 99.9 percent of the individuals within the terrestrial wildlife populations and represents a level of acceptable risk.

A summary of lethal and sublethal RTVs selected from the ingestion toxicity data is provided in Table D-3 of Appendix D.

If neither lethal nor sublethal toxicity information is available for a taxonomic group, then no RTV is identified and risk associated with the respective ECPC is not quantitatively evaluated. However, the absence of specific data for a taxonomic group does not imply that there is no toxicological effect associated with contaminant exposure by these receptors; therefore, potential risks to these taxonomic groups are qualitatively discussed in the Uncertainties Section (Section 7.7).

<u>7.5.2 Terrestrial Plants and Invertebrates</u> The assessment endpoints selected for terrestrial plants and soil invertebrates at Site 9 are reduction in the biomass of terrestrial plants and abundance of soil invertebrates. Site-specific toxicity data for plants and invertebrates are not available; therefore, the results of toxicity studies from the literature that relate the soil concentrations of a contaminant with adverse effects to growth, reproduction, or survival

of a test population are used as a measure of the assessment endpoint. These study results are summarized for each ECPC in Appendix D, Tables D-4 (plants) and D-5 (invertebrates).

The assessment endpoints selected for terrestrial plants and soil invertebrates at Site 10 are survival and growth of these communities. The toxicity of surface soil at Site 10 was measured using two laboratory toxicity tests: a 14-day survival and a 30-day growth test with earthworms (*E. foetida*) and a 120-hour lettuce seed (*L. sativa*) germination test.

Surface soil samples for toxicity testing were collected from three locations at Site 10 (10N00201, 10N00301, and 10N00501) and two reference soils from uncontaminated sites at NAS Whiting Field (BKN00301, and its duplicates BKN00301D and BKN00101). The Site 10 and reference soil samples were collected concurrently with surface soil samples (10S00201, 10S00301, 10S00501, BKNS00301, and BKNS00101) for chemical analyses and represent split samples. The results of the chemical analyses can, therefore, be used to establish contaminant exposure concentrations and provide the means to interpret responses in the bioassays. If adverse effects were observed in either of the bioassays, simple linear regressions were completed to determine if a correlation(s) exists between the concentration of an analyte and the adverse response measured in the bioassay.

The results of the earthworm and lettuce seed toxicity testing of surface soil samples from Site 10 are presented in Table 7-9. Additional information on the toxicity testing of Site 10 surface soil with *E. foetida* and *L. sativa* is included in Appendix F of the GIR (HLA, 1998).

Table 7-9
Results of Site 10 Surface Soil Toxicity Testing

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Sample Location	Earthworm (*Eisenia foetida*)		Lettuce Seed (*Lactuca sativa*)
	Survival After 14 days (30 days) (%)	Weight Change (%)[a]	Germination After 120 Hours (%)
10N00201	100 (100)	3.2	60*
10N00301	100 (100)	-5.0*	95
10N00501	100 (100)	6.2	83*
Laboratory Control[b]	100 (81)	13	91[b]
BKN00301 (Reference)	100 (100)	10.9	97
BKN00301D (Reference)	100 (100)	5.0	90
BKN00101 (Reference)	100 (63)*	29.1	43*

Notes: [a] Growth of *E. foetida* is expressed as mean individual wet weight.
* Significantly different from the laboratory control[b] and reference BKN00301.
% = percent.

Because the earthworm survival and lettuce seed germination data in the reference sample, BKN00101, were significantly different ($P \leq 0.05$) than the reference location, BKN00301, and data from sample BKN00301 were not significantly different from the laboratory control, toxicity data from BKN00101 were not included in the statistical comparison of site-related data and control/reference data. Site-related toxicity data were evaluated by a statistical comparison of mean survival, growth (as wet weight), or germination with the reference sample (BKN00301 and BKN00301D) and the laboratory control.

In the three surface soil samples collected from Site 10, survival of *E. foetida* after 14 and 30 days was 100 percent, indicating no acute or chronic lethal toxicity. Growth of *E. foetida* in the laboratory control and reference sample, BKN00301, was significantly different ($P \leq 0.05$) from growth in soil from sampling station 10N00301. Earthworms in surface soil from sample 10N00301 exhibited a 5 percent weight reduction as compared to a 10.9 and 5 percent weight gain in the reference sample and its duplicate, respectively.

Soil collected from two of the three Site 10 locations inhibited germination of the lettuce seed. Germination potential of lettuce seed, *L. sativa*, in the laboratory control and reference sample, BKN00301, was significantly different ($P \leq 0.05$) from surface soil collected from locations 10N00201 and 10N00501. Germination in the reference samples was 97 and 90 percent (for samples BKN00301 and BKN00301D, respectively) as compared to 60 percent in sample 10N00201 and 83 percent in sample 10N00501.

<u>7.6 RISK CHARACTERIZATION</u>. This section presents the risk characterization for potential ecological receptors exposed to surface soil and surface water at Site 9 and to surface soil at Site 10. Potential risks associated with exposures to ECPCs in surface soil and surface water at Site 9 and surface soil at Site 10 are discussed separately for wildlife, terrestrial plants, and soil invertebrates. Risks to wildlife are characterized by comparing the PDE concentrations (based on RME and CT exposure concentrations) for each surface soil and surface water ECPC with its respective RTV (estimated threshold dose for toxicity). Risks for terrestrial plants and soil invertebrates are evaluated by comparing toxicity benchmarks to RME and CT exposure concentrations.

<u>7.6.1 Terrestrial Wildlife</u> Risks for the representative wildlife species associated with ingestion and bioaccumulation of ECPCs in surface soil, prey items, and surface water (for Site 9) are quantitatively evaluated using HQs. HQs are calculated for each ECPC by dividing the PDE concentration by the selected lethal and sublethal RTV. HIs are determined for each receptor by summing the HQs for all ECPCs. When the estimated PDE is less than the RTV (i.e., the HQ < 1), it is assumed that chemical exposures are not associated with adverse effects to receptors and no risks to wildlife populations exist. For instance, if the RME exposure concentrations are used in the PDE model and the results are less than the lethal RTV, then it is assumed that adverse effects to the survival of wildlife populations are unlikely to occur. Similarly, if the reasonable maximum PDE is less than the sublethal RTV, then it is assumed that adverse effects to wildlife populations related to growth and reproduction are unlikely to occur. When an HI is greater than 1, a discussion of the ecological significance of the HQs comprising the HI is completed and risks from exposure to CT concentrations of ECPCs are evaluated.

This hazard ranking scheme evaluates potential ecological effects to individual organisms and does not evaluate potential populationwide effects. Contaminants may cause population reductions by affecting birth and mortality rates, immigration, and emigration (USEPA, 1989b). In many circumstances, lethal or sublethal effects may occur to individual organisms with little population or community-level impacts. However, as the number of individual organisms experiencing toxic effects increases, the probability that population effects will occur also increases. The number of affected individuals in a population presumably increases with increasing HQ or HI values; therefore, the likelihood of population-level effects occurring is generally expected to increase with higher HQ or HI values.

The lethal and sublethal HQs and HIs are calculated for each ECPC and each representative wildlife species. Paragraph 7.6.1.1 and Tables D-6 through D-12 of Appendix D present the HQ and HI calculations for surface soil at Site 9, and Tables D-13 through D-16 of Appendix D present the HQ and HI calculations for surface water at Site 9. Paragraph 7.6.1.2 and Tables D-17 through D-23 of Appendix D present the HQ and HI calculations for Site 10 surface soil. A summary of risks to representative wildlife receptors exposed to ECPCs at Sites 9 and 10 are provided in Tables 7-10 through 7-12, respectively.

Table 7-10
Summary of Hazardous Indices for Terrestrial Wildlife[1]
Associated with Exposure to Site 9 Surface Soil

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Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Lethal Effects from Exposure to Central Tendency EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Central Tendency EPCs
Cotton mouse	0.21	0.14	2.7	1.9
Eastern meadowlark	0.031	0.019	0.53	0.33
Short-tailed shrew	1.2	0.82	16	11
Mourning dove	0.0096	0.0059	0.17	0.1
Red fox	0.0011	0.00074	0.014	0.0098
Great horned owl	0.00058	0.00035	0.01	0.0061

[1] HIs are presented in Tables D-6 through D-12 in Appendix D. EPC = exposure point concentration.

7.6.1.1 **Site 9** Risks for representative wildlife species associated with exposure to ECPCs in Site 9 surface soil and surface water are discussed separately below.

Site 9 Surface Soil. Lethal effects HIs for cotton mouse, eastern meadowlark, red fox, and great horned owl exposed to RME and CT exposure concentrations of Site 9 surface soil ECPCs are less than 1; therefore, risks are not predicted for these receptors. Although the lethal effect HI for the short-tailed shrew exposed to RME concentrations is slightly greater than 1 (HI = 1.2), the CT lethal effect HI (HI = 0.82) is less than 1. Considering the conservative assumptions used in the risk calculation, it is unlikely that population-level effects to the survivability of the short-tailed shrew will result from exposure to surface soil from Site 9.

Sublethal risks are predicted for the cotton mouse and short-tailed shrew based on both RME and CT exposure concentrations from Sites 9 surface soil. The sublethal HIs for cotton mouse (RME HI = 2.7 and CT HI = 1.9) and short-tailed shrew (RME HI = 16 and CT HI = 11) are well above 1 based on both the RME and CT exposure concentrations. The primary contributor to the sublethal HI for cotton mouse and short-tailed shrew is aluminum.

Site 9 Surface Water. As shown in Table 7-11, summary HIs for wildlife receptors (e.g., cotton mouse, short-tailed shrew, and red fox) exposed to RME exposure concentrations of surface water ECPCs for both lethal and sublethal effects were less than 1; therefore, risks associated with ingestion of Site 9 surface water are not predicted for these receptors. HIs were not calculated for eastern meadowlark, mourning dove, and great horned owl because avian ingestion toxicity data are not available for ECPCs in Site 9 surface water.

Site 9 Summary. The results of the food-web modeling suggest sublethal risks (i.e., reduction in growth and reproduction) to small mammals associated with ingestion of aluminum in the surface soil and food items. The bioaccumulation of these inorganics is unlikely to result in adverse population-level effects to higher trophic predators. Also, ingestion of surface water is unlikely to increase the risk to potential receptors.

7.6.1.2 Site 10 As summarized in Table 7-12, lethal effect HIs for cotton mouse, eastern meadowlark, mourning dove, red fox, and great horned owl exposed to RME exposure concentrations of Site 10 surface soil ECPCs are less than 1; therefore, risks are not predicted for these receptors.

Although a lethal effect HI slightly greater than 1 (HI = 1.2) is calculated for the short-tailed shrew exposed to RME exposure concentrations of ECPCs from surface soil, the CT lethal effect HI (HI = 0.76) is less than 1. Considering the conservative assumptions used in the risk calculation, it is unlikely that population-level effects to the survivability of the short-tailed shrew will result from exposure to surface soil from Site 10.

Sublethal risks are predicted for all representative wildlife species with the exception of the great horned owl based on both RME and CT exposure concentrations from Site 10 surface soil. The sublethal HIs for cotton mouse (RME HI = 8.5 and CT HI = 4.0), eastern meadowlark (RME HI = 5.2 and CT HI = 2.9), mourning dove (RME HI = 4.9 and CT HI = 3.0), short-tailed shrew (RME HI = 22 and CT HI = 11), and the red fox (RME HI = 1.4 and CT HI = 1.2) are greater than 1 based on both the RME and CT exposure concentrations. The primary contributors to the sublethal HI for the cotton mouse are aluminum, cadmium, and zinc. For the short-tailed shrew they are aluminum, cadmium, vanadium, zinc, and Aroclor-1254, for the eastern meadowlark they are cadmium and Aroclor-1254, and for the mourning dove, the primary risk driver is cadmium. Because RME and CT HI values for the red fox are only slightly elevated above 1, population-level risks to predatory mammals at Site 10 is not expected.

The results of the food-web modeling suggest sublethal risks may occur (i.e., reduction in growth and reproduction) to small mammals and birds associated with ingestion of Aroclor-1254 and aluminum, cadmium, vanadium, and zinc in the surface soil. However, the openness of Site 10 may preclude small mammals and birds from exclusively foraging in this area due to increased risk of predation.

7.6.2 Terrestrial Plants Risks for terrestrial plants at Site 9 are evaluated by comparing the selected phytotoxicity RTVs to the RME and CT exposure concentrations. Risks for terrestrial plants at Site 10 are evaluated based on

Table 7-11
Summary of Hazard Indices for Terrestrial Wildlife[1]
Associated with Exposure to Site 9 Surface Water

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Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs
Cotton mouse	0.00013	0.00055
Eastern meadowlark	NA	NA
Mourning dove	NA	NA
Short-tailed shrew	0.00013	0.00056
Red fox	0.000077	0.00032
Great horned owl	NA	NA

[1] HIs are presented in Tables D-13 through D-16 in Appendix D.

Notes: EPC = exposure point concentration.
NA = not available.

Table 7-12
Summary of Hazard Indices for Terrestrial Wildlife[1]
Associated with Exposure to Site 10 Surface Soil

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Ecological Receptors	Lethal Effects from Exposure to Reasonable Maximum EPCs	Lethal Effects from Exposure to Central Tendency EPCs	Sublethal Effects from Exposure to Reasonable Maximum EPCs	Sublethal Effects from Exposure to Central Tendency EPCs
Cotton mouse	0.5	0.27	8.5	4.0
Eastern meadowlark	0.049	0.033	5.2	2.9
Mourning dove	0.012	0.0087	4.9	3.0
Short-tailed shrew	1.3	0.76	22	11
Red fox	0.0048	0.0024	1.4	1.2
Great horned owl	0.0037	0.009	0.87	0.55

[1] HIs are presented in Tables D-17 through D-23 in Appendix D.

Note: EPC = exposure point concentration.

the results of soil toxicity tests using lettuce seeds. Paragraphs 7.6.2.1 and 7.6.2.2 discuss potential risks to terrestrial plants at Sites 9 and 10, respectively.

7.6.2.1 Site 9 Table 7-13 presents the phytotoxicity RTVs and the RME and CT exposure concentrations for ECPCs selected for Site 9 surface soil. Phytotoxicity benchmarks are not available for 1,4-dichlorobenzene and 1,2,4-trichlorobenzene.

RME and CT exposure concentrations of aluminum, antimony, and vanadium exceed their respective phytotoxicity benchmarks. Site 9 was identified as a potentially contaminated site because of anecdotal evidence suggesting petroleum disposal. However, petroleum products were not identified at the site. The vegetative covering is consistent with recolonization of a borrow pit and does not show stressed vegetation typical of petroleum or heavy metal disposal. Although concentrations of several metals exceed phytotoxicity benchmarks, the sparse vegetative area at Site 9 appears to be the result of physical disturbances and/or soil type rather than site-related contamination. The majority of the site is covered with planted pines; therefore, reductions in plant biomass or plant cover availability are not expected such that foraging small mammal and bird populations would be impacted.

7.6.2.2 Site 10 Surface soil from sampling locations 10N00201 and 10N00501 inhibited germination of the lettuce seed as compared to the reference sample, BKN00301, and the laboratory control. Appendix I presents a series of simple linear regression analyses evaluating statistical relationships between biological effects observed in the surface soil bioassays and concentrations of selected analytes in Site 10 surface soil. Although germination of lettuce seeds was slightly inhibited at two of the Site 10 surface soil sampling locations, no correlation between germination inhibition and ECPC concentrations was observed (Appendix I). It is possible that reduced germination observed at 10S00201 and 10S00501 was either the result of synergistic effects of multiple contaminants or not related to site contamination. Nonmeasured physical, biological, or chemical factors may be responsible for the observed slight reduction in lettuce seed germination (i.e., ECPC exposure concentration is likely not responsible for the observed effect).

<u>7.6.3 Terrestrial Invertebrates</u> Risks for terrestrial invertebrates at Site 9 are evaluated by comparing invertebrate toxicity benchmark values to RME and CT exposure concentrations. Risks for soil invertebrates at Site 10 are evaluated based on the results of soil toxicity tests using earthworms. Paragraphs 7.6.3.1 and 7.6.3.2 discuss potential risks to terrestrial invertebrates at Sites 9 and 10, respectively.

7.6.3.1 Site 9 Table 7-13 presents the invertebrate RTV and the RME and CT concentrations for Site 9 surface soil ECPCs. Invertebrate benchmarks are not available for any of the ECPCs in Site 9 surface soil. Therefore, it is not possible to quantitatively evaluate risks to terrestrial invertebrates at Site 9. Due to the close proximity and similarities in soil type between Sites 9 and 10, the results of the Site 10 toxicity testing are used to draw conclusions concerning the assessment endpoint of reduction in abundance of earthworms at Site 9. With the exception of two SVOCs and antimony, which were either not detected or not selected as ECPCs at Site 10, detected concentrations of ECPCs in Site 9 surface soil (aluminum and vanadium) are roughly equivalent or well below concentrations detected in Site 10 surface soil. The results of the toxicity

Table 7-13
Ecological Risk for Plants and Invertebrates in Surface Soil at Site 9

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Naval Air Station Whiting Field
Milton, Florida

Analyte	Exposure Point Concentration[1]		RTV		RTV Exceeded? (by RME/by CT)	
	Reasonable Maximum Exposure	Central Tendency Exposure	Plant[2]	Invertebrate[2]	Plant	Invertebrate
Semivolatile Organic Compounds (mg/kg)						
1,4-Dichlorobenzene	120	120	NA	NA	NA	NA
1,2,4-Trichlorobenzene	110	110	NA	NA	NA	NA
Inorganic analytes (mg/kg)						
Aluminum	29,300	20,354	50	NA	Yes/Yes	NA
Antimony	8.3	6.5	5	NA	Yes/Yes	NA
Vanadium	76.7	46.6	2	NA	Yes/Yes	NA

[1] EPCs are presented in Table 7-2. The RME EPCs are equal to the lesser of the maximum detected concentration and the 95 percent upper confidence limit. CT EPCs are equal to the mean of all concentrations. When the mean is greater than the RME EPC, then the RME EPC is used for both the RME and CT concentrations.
[2] Plant and invertebrate RTVs are presented in Appendix D, Table D-4 and D-5, respectively. Generally, the plant RTVs are the lowest observed effect concentration from among growth studies on plants in solid media. Invertebrate RTVs are the lowest concentration lethal to 50 percent of a test population (14-day soil test on *Eisenia foetida*) from among chemicals in the same chemical class (applies to organic compounds). A conservative factor of 0.2 was applied to invertebrate RTVs; the resultant value should be protective of 99.9 percent of the population from acute effects (Neuhauser et. al., 1986).
[3] Comparison shown is RME EPC to RTV over CT EPC to RTV.

Notes: RTV = reference toxicity value.
RME = reasonable maximum exposure.
CT = central tendency.
mg/kg = milligrams per kilogram.
NA = not available.
= shading indicates exceedances.
EPC = exposure point concentration.

testing at Site 10 show no acute or chronic lethal toxicity to earthworms. Given that fewer ECPCs were selected in surface soil at Site 9 and that concentrations of similar ECPCs were either equivalent or less than those detected at Site 10, it is unlikely that detected concentrations of ECPCs at Site 9 would reduce invertebrate biomass and/or abundance such that small mammal and bird populations would be affected.

7.6.3.2 **Site 10** The results of the toxicity testing show that surface soil samples collected from Site 10 are not expected to impact the survival of terrestrial invertebrate communities. After 30 days of exposure to Site 10 surface soil, survival of earthworms in the toxicity test was 100 percent. However, growth of earthworms at sampling location 10N00301, as measured by percent weight change, was significantly different ($P \leq 0.05$) from the laboratory control and reference sample BKN00301.

Sampling station 10S00301 is characterized by concentrations of TRPH well above any other surface soil sampling location at Site 10. TRPH was detected at 666 mg/kg at this station as compared to a range of 3.3 to 85.5 mg/kg at the other sampling stations. Simple linear regression analyses presented in Appendix H suggest that concentrations of TRPH are positively correlated with reduced earthworm growth with an R^2 value of 0.97. As concentrations of TRPH increase (i.e., at station 10S00301), earthworm growth decreases. The results of the linear regression suggest that elevated concentrations of TRPH at station 10S00301 may have the potential to impact the growth of invertebrate communities at Site 10.

<u>7.7 UNCERTAINTY ANALYSIS</u>. The objective of the uncertainty analysis is to discuss the assumptions of the ERA process that may influence the risk assessment results and conclusions. Table 2-5 of the GIR presents several general uncertainties inherent in the risk assessment process (HLA, 1998).

Specific uncertainties associated with exposure to surface soil at Sites 9 and 10 and surface water at Site 9 include the following:

- Risks to avian species may have been underestimated because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with several ECPCs in surface soil were not evaluated for avian species. Risks to avian species associated with ingestion of surface water at Site 9 were also not evaluated because avian toxicity data for the surface water ECPCs are not available in the literature. If the toxicological and contaminant transport data obtained from studies conducted on mammals were used to estimate risks to avian species, then risk estimates for birds would be higher. However, there is also uncertainty in assuming the metabolic functions of mammals and birds are similar enough to use intertaxonomic surrogates.

- Risks to adult amphibians and reptiles species were not estimated because bioaccumulation and toxicity data for this taxonomic group are generally lacking in the literature. As a result, potential risks associated with ECPCs are uncertain for these species. Intertaxonomic surrogates were not used to calculate dietary risks to reptiles because of the uncertainty associated with extrapolation of data from endothermic to essentially ectothermic species.

- Risks associated with inhalation and dermal absorption of contaminants were not quantitatively evaluated in the ERA. Ground-dwelling species that may be dermally exposed to contaminants in surface soil are likely to ingest the contaminants as part of grooming or preening activities. However, if contaminants are absorbed through the skin prior to incidental ingestion, then risks to ground-dwelling species, such as mice and shrews, may be underestimated.

- If exposure of adult amphibians and reptiles to contaminants at Sites 9 and 10 results in similar chemical ecotoxicity and bioaccumulation as compared to terrestrial mammals and birds, then reptiles and amphibians may experience adverse sublethal effects.

- BAFs for plant material are based on the assumption that plants are 80 percent water. This assumption applies to berries and leafy vegetables, but does not apply to grains, which have a moisture content of only 10 percent. Because the diets of the mouse and the mourning dove consist primarily of grains, the risks to these receptors may be underestimated.

- Site-specific toxicity data for Site 9 surface soil are not available. Phytotoxicity benchmark values used in the risk assessment were designed for risk screening purposes only and may not be relevant to the specific conditions of the surface soil at Site 9. The conservative nature of these literature values may overestimate the actual risk to terrestrial plants at Site 9. However, phytotoxicity and invertebrate benchmark values for several analytes are not available, potentially resulting in an underestimation of risk.

- As previously discussed, site-specific toxicity data for Site 9 surface soil are not available. Invertebrate benchmark values were also not available for any of the ECPCs in Site 9 surface soil; therefore the results of the earthworm toxicity tests from Site 10 were used to draw conclusions regarding the risk characterization for terrestrial invertebrates at Site 9. If surface soil conditions are not similar between the two sites, risks to terrestrial invertebrates at Site 9 may be underestimated.

    - An assumption has been made that organisms evaluated in the toxicity tests are representative of species at the site. Depending on the sensitivities of terrestrial plants and invertebrates occurring at Site 10, risks may be over- or underestimated.

    - Although selected as an ECPC for Site 10 surface soil, exposures of TRPH to terrestrial wildlife (i.e., mammals and birds) were not evaluated in the ERA because toxicological benchmarks are not available. TRPH was detected in three samples collected during the 1996 Phase IIB investigation at concentrations ranging from 3.3 to 666 mg/kg. It is believed that detected concentrations of TRPH are likely the result of past disposal practices at Site 10. Based on the detected concentrations of volatile and semivolatile constituents, and the finding of no risk associated with these constituents, it is unlikely that detected concentrations of TRPH in the surface soil of Site 10 pose a risk to terrestrial wildlife receptors.

- The simple linear regressions for TRPH were based on data collected from only three surface soil samples at Site 10; therefore, the statistical power of the test is decreased by the low sample size.

<u>7.8 SUMMARY OF ECOLOGICAL ASSESSMENT FOR SITES 9 AND 10</u>. Potential risks to ecological receptors including terrestrial wildlife, terrestrial plants, and soil invertebrates were evaluated from a variety of ECPCs in surface soil at Sites 9 and 10 and in surface water at Site 9.

Risks associated with exposures to ECPCs in Sites 9 and 10 surface soil and Site 9 surface water were evaluated for terrestrial wildlife based on a model that estimates the amount of contaminant exposure obtained via the diet and incidental ingestion of surface soil and surface water. Wildlife risks are evaluated by comparing the estimated doses for wildlife species (mammals and birds) to a reference toxicity dose representing the threshold at which lethal or sublethal effects may occur.

No lethal or sublethal risks were identified for wildlife ingestion of surface water from Site 9. Direct and indirect ingestion of aluminum in Site 9 surface soil and food items by small mammals resulted in potential sublethal risks (i.e., reduction in growth and reproduction). At Site 10 sublethal risks to small mammals and birds are predicted. Potential reduction in the growth and reproduction of small mammals and birds is associated with ingestion of Aroclor-1254 and aluminum, cadmium, vanadium, and zinc in the soil and food items at Site 10.

Risks to terrestrial plants and soil invertebrates at Site 9 were evaluated based on benchmark values from the literature. Although aluminum, antimony, and vanadium exceeded their respective phytobenchmark values, reductions in plant biomass or plant cover availability are not expected to occur at Site 9 such that foraging small mammal and bird populations would be impacted. Invertebrate benchmark values were not available for ECPCs in Site 9 surface soil. Due to the close proximity and similarities in soil type between Sites 9 and 10, the results of the Site 10 toxicity testing are used to draw conclusions concerning the assessment endpoint at Site 9 (reduction in abundance of earthworms). Given that fewer ECPCs were selected in surface soil at Site 9 and that concentrations of similar ECPCs were either equivalent or less than those detected at Site 10, it is unlikely that detected concentrations of ECPCs at Site 9 would reduce invertebrate biomass and/or abundance such that small mammal and bird populations would be affected.

Risks to terrestrial plants and soil invertebrates at Site 10 were evaluated based on the results of laboratory toxicity testing, earthworms (*E. foetida*) and lettuce seeds (*L. sativa*), using surface soil samples from Site 10. Although a reduction in lettuce seed germination was observed in two of the surface soil samples (10S00201 and 10S00501), there was no apparent correlation between any of the ECPC concentrations and observed responses. It is likely that a non-ECPC stressor (i.e., another physical, chemical, or biological stressor) is responsible for germination inhibition at Site 10. At station 10S00301, significant reduction in earthworm growth (-5 percent) was observed. It is likely that elevated TRPH (666 mg/kg) is at least partially responsible for the observed growth reduction in the laboratory toxicity tests.

8.0 CONTAMINANT FATE AND TRANSPORT

This chapter discusses the fate and transport of human health and ecological CPCs detected in soil, surface water, and groundwater samples at Sites 9 and 10. Fate, in the context of this chapter, refers to the ultimate disposition of a given CPC following its release into the environment. Transport refers to the mechanism(s) by which a given chemical released into the environment will arrive at its fate. Explanation of the fate and transport of chemicals in the environment can be very complicated or very simple, depending on the physical, chemical, and biological characteristics of the compound or metal considered and the environment into which that compound is released.

Several organic compounds and inorganics were detected in soil and groundwater samples at Sites 9 and 10. Because of the number of potential chemicals detected and the myriad fate and transport scenarios possible for those chemicals in the media, this discussion will focus only on those chemicals that may pose adverse risk to human or ecological receptors, as identified by the HHRA (Chapter 6.0) and the ERA (Chapter 7.0) in this report.

The following discussion of contaminant fate and transport is divided into two sections. Section 8.1 discusses potential migration routes of chemicals in the media evaluated and does not focus specifically on media found to be of concern at Sites 9 and 10. The site-specific persistence, fate, and transport of those compounds and elements found to pose a potential risk to human health or the environment are discussed in Section 8.2.

8.1 POTENTIAL ROUTES OF MIGRATION. Several routes of migration are possible for a contaminant in the various media: air, soil, surface water, groundwater, and biota. These routes are summarized below.

Air. Gases and particulate material can be transported in the atmosphere. Organic compounds, metals, and metal complexes that exist as gases at surface temperature and pressure may disperse or diffuse into the air and particulates may become entrained in air and thereby migrate. The extent to which gaseous constituents and particulate material remain airborne is a function of the level of excitation of the air (wind and temperature) and fate processes acting on the constituent and, for particulates, their density. Particulate material as discussed herein consists of organic compounds and inorganic material that would otherwise not be present in a gaseous medium under atmospheric conditions.

Soil. The primary agents of migration acting on soil include wind, rainwater, running water, biological activity, and human activity. Wind commonly transports soil in the form of particulate material. Rainwater may cause soil to migrate either by washing soil particles downward into the subsurface or by carrying soil particles overland to surface water bodies or other areas of deposition. The amount and type of vegetative cover and surface disturbance affects the degree to which wind and water cause soil to migrate.

Surface Water. The mechanisms for migration of constituents in surface water are dissolution and suspension. Several organic compounds and metals are soluble in water and can be transported in the aqueous phase. Other organic compounds and elements are not soluble in water, but may be transported by surface water via suspension. The amount of suspended particulate material in surface water is largely a function of the water's energy; as that energy decreases, suspended material will settle and become part of the soil or sediment. Colloidal material may remain in suspension (by electrochemical forces) in water of very low energy (e.g., standing water).

Sediment. Saltation, traction, suspension, biological action, and human action are the primary mechanisms of migration for sediment. Physical, chemical, and biological processes affecting a constituent will determine where and how migration from sediment will occur.

Groundwater. Groundwater is a liquid medium capable of transporting constituents as colloidal forms, as complexes, as pure-phase liquids or as dissolved-phase liquids. Organic compounds and elements generally reach groundwater either by being placed directly into the water table (e.g., disposal pits) or by being leached from soil or solid waste to the water table by physical or chemical processes. Groundwater may discharge to the land surface, surface water bodies, other aquifers, or pumping wells. The migration of constituents from groundwater upon discharge depends on the chemical and/or physical processes acting upon that individual constituent in the medium to which it is discharged.

Biota. Biota may be considered a medium for migration of certain organic compounds and inorganics. Several compounds and elements are known to accumulate in the tissues of organisms at various levels in the food chain. As these organisms are consumed by other organisms, compounds and elements are accumulated in their tissue and passed on to organisms higher in the food chain. In this manner, contaminants may be transported by biota. Additionally, some organisms disturb bed sediments in streams and rivers. This disturbance can cause organic compounds and elements to be transported downstream as suspended material in surface water.

8.2 CONTAMINANT PERSISTENCE AND FATE. The discussion of contaminant persistence and fate in the environment is divided into three subsections. Subsection 8.2.1 discusses the processes that control the persistence and fate of organic compounds and inorganics in the environment. Subsection 8.2.2 discusses the primary persistence and fate characteristics of the constituents detected at Sites 9 and 10. Subsection 8.2.3 discusses contaminant transport for Sites 9 and 10.

8.2.1 Processes The persistence and fate of chemical constituents in the environment depends on various chemical, physical, and biological processes. The predominant processes affecting the environmental persistence and fate of chemical constituents include solubility, photolysis, volatilization, hydrolysis, oxidation, chemical speciation, complexation, precipitation or co-precipitation, cationic exchange, sorption, biodegradation or biotransformation, and bioaccumulation. These processes are briefly summarized below.

Solubility. The solubility of chemical constituents in water is important in assessing their mobility in the environment. This is particularly important for the transport and ultimate fate of chemicals from soil and sediment to water (i.e., groundwater and/or surface water). Generally for organic compounds, aqueous solubility is a function of molecular size, molecular polarity, temperature, and the presence of other dissolved organic co-solvents. For metals and other inorganic parameters, solubility is generally controlled by chemical speciation, pH, redox potential (Eh), oxygen content, and the presence of dissolved and/or colloidal organic compounds (e.g., humic and fulvic acids) or other inorganic ion species (e.g., hydroxides and sulfates) (USEPA, 1979). Increased solubility is usually directly related to increased environmental mobility with groundwater and/or surface water being the principal transport medium. Therefore, solubility is a significant factor affecting the fate of a compound or element in the water environment.

<u>Photolysis</u>. Many chemical constituents, particularly organic compounds, are susceptible to photolytic degradation either directly or indirectly. Direct photolysis involves a splitting of the chemical compound by light, whereas indirect photolysis occurs when another compound is transformed by light into a reactive species (i.e., usually a hydroxyl radical) that reacts with and modifies the original compound. In general, photolysis primarily occurs within the atmosphere, although it may also occur to a limited extent in surface water and/or soil under certain environmental conditions (USEPA, 1979).

<u>Volatilization</u>. Volatilization of organic chemicals from soil or water to the atmosphere is an important pathway for chemicals with high vapor pressures. For organic compounds, volatilization is a function of partial pressure gradients, temperature, and molecular size and is more likely to occur for compounds with low molecular weights. In addition, certain metals such as mercury, arsenic, and lead are capable of undergoing biologically mediated transformation (i.e., alkylation) that form volatile end products. Volatilization is important for the transport of certain chemical constituents from surface soil (i.e., vadose zone), sediment, and surface water and is evaluated using Henry's law and other associated chemical-specific rate constants.

<u>Hydrolysis</u>. Hydrolysis involves the decomposition of a chemical compound by its reaction with water. The rate of reaction may be promoted by acid (hydronium ion, $[H_3O^+]$) and/or base (hydroxyl ion, $[OH^-]$) compounds. In general, most organic compounds are resistant to hydrolytic reactions unless they contain a functional group (or groups) capable of reacting with water. Metallic compounds, however, generally dissociate readily in water depending upon the aqueous environmental conditions (e.g., pH and ionic strength). For metals, hydrolytic dissociation is an indirect process that affects the primary fate and transport mechanism of aqueous solubility.

<u>Oxidation</u>. The direct oxidation of organic compounds in natural environmental matrices may occur but this is generally a slow, insignificant transformation mechanism of minimal importance (USEPA, 1979). However, some inorganic compounds may be rapidly oxidized under naturally occurring environmental conditions when the surrounding environment changes from anaerobic to aerobic conditions.

<u>Chemical Speciation</u>. Chemical speciation is important primarily for metals that may exist in multiple forms in the environment, particularly within aqueous matrices. In general, the aqueous speciation of metals depends primarily upon the relative stabilities of individual valence states (which are element specific), oxygen content, pH and Eh condition, and the presence of available complexing agents and/or other cations and anions (USEPA, 1979). Because various metallic species exhibit differential aqueous solubilities and differential mobilities within soils and/or sediments (USEPA, 1979), the particular speciation of an individual metal will greatly affect its environmental mobility.

Complexation. For metals, complexation with various ligands is an important process because these complexes may be highly soluble in water. Complexation may, therefore, greatly enhance mobility within environmental matrices, particularly in groundwater and surface water, depending upon the aqueous solubility of the resulting complex. Complexation depends upon numerous factors such as pH, Eh, type and concentration of complexing ligands, and other ions present (USEPA, 1979).

Most metals are capable of forming numerous organic and/or inorganic complexes in the natural environment (USEPA, 1979). Metals may form organo-metallic complexes, especially with naturally occurring organic acids (i.e., humic and fulvic acids). In some cases, these metallic species may exhibit varying affinities for different organic ligands (i.e., mercury and arsenic for amino acids and their derivatives) (USEPA, 1979). Metals may also form metallo-inorganic complexes with inorganic ligands such as carbonate, halogens (usually chlorine), hydroxyl, and sulfate (USEPA, 1979). However, organo-metallic complex formation is usually favored over metallo-inorganic complexes.

Precipitation and Co-Precipitation. Both chemical precipitation and co-precipitation are important removal mechanisms, particularly for metals and metallo-cyanides in the environment. Precipitation and/or co-precipitation reactions depend on numerous aqueous environmental conditions such as pH, Eh, organic ligands present, oxygen content, and cationic and anionic species present (USEPA, 1979). Depending on the specific conditions, the removal of aqueous metallic species and metallo-cyanides from groundwater and/or surface water can greatly affect a metal's environmental mobility and, hence, its ultimate fate and transport.

Cation Exchange. Cation exchange is important primarily for metals and other ions that may substitute with other cations of similar charge and size within the lattice structure of clay minerals in soil and/or sediment (USEPA, 1979). This process, therefore, can significantly affect the mobility of an aqueous metal cation by removing it from solution under certain environmental conditions.

Sorption. The sorption of chemical constituents by inorganic particulate matter (i.e., soil or sediment) and organic compounds is an important process that affects mobility in the environment. This process is particularly important for the fate and transport of chemicals from soil or sediment to water (i.e., groundwater and surface water). In general, most metals exhibit a potential for adsorption to inorganic particulate matter and organic compounds (USEPA, 1979). Organic compounds also exhibit sorptive capability, but show greater variability in their ability to sorb to particulate or organic matter. The tendency for organic compounds to sorb to soils or sediment is reflected in their organic carbon partitioning coefficients (K_{oc}). K_{oc} is a measure of relative adsorption potential. The normal range of K_{oc} values is from 1 to 10^7 with higher values indicating greater sorption potential. Actual adsorption is chemical specific and is largely dependent on the organic content of the soil. The fraction of organic carbon, f_{oc}, in soil multiplied by the K_{oc} is defined as the distribution coefficient, K_d. The K_d is a ratio of the concentration adsorbed to the concentration partitioned to water.

Regardless of chemical class, sorption is a reversible process whereby desorption can be favored over sorption under certain environmental conditions (e.g., low pH for metals). For organic compounds in general, as the molecular weight increases and the aqueous solubility decreases (i.e., low polarity and high hydrophobicity), the sorptive binding affinity increases (i.e., K_{oc} increases). The tendency for chemical constituents to adsorb to inorganic particulate and/or organic compounds is a particularly important process because sorption to soils and/or sediments can effectively reduce a chemical constituent's mobility.

Biodegradation or Biotransformation. Biodegradation is a result of the enzyme-catalyzed transformation of chemicals. Organisms require energy, carbon, and essential nutrients from the environment for their growth and maintenance. In the process, chemicals from the environment will be transformed by enzymes into a form that can be used by the organism. The biodegradation rate is the rate by which contaminants will be degraded. The rate is a function of microbial biomass and a chemical's concentration under given environmental conditions. When a pollutant is introduced into the environment, there is often a lag time before biodegradation begins as the organism generates an enzyme capable of digesting the chemical. Co-metabolism occurs when a pollutant can be biotransformed only in the presence of another compound that serves as a carbon and energy source (USEPA, 1979).

Bioaccumulation. Bioconcentration and bioaccumulation data are important when evaluating the impact of chemicals in the aquatic environment. The process is characterized by hydrophobic chemicals that can be partitioned into fat and lipid tissues and inorganic chemicals that can be partitioned into bone marrow. The bioconcentration factor (BCF) is a measure of the concentration of a chemical in tissue (on a dry-weight basis) divided by the concentration in water, and is a commonly used parameter to quantify bioconcentration (USEPA, 1979). The process is significant because bioaccumulation magnifies up through the food chain.

8.2.2 Persistence and Fate of Sites 9 and 10 CPCs This section discusses the persistence and fate characteristics for constituents identified in the human health and ecological risk assessments (Chapters 6.0 and 7.0, respectively) as risk-drivers. To focus this section on persistence and fate characteristics, only those constituents identified as risk drivers and that are above relevant standards will be addressed. These constituents are summarized below by medium for Sites 9 and 10.

Site 9

Human Health Assessment Constituents:

- Surface soil: aluminum, antimony, arsenic, chromium, iron, and vanadium
- Groundwater: aluminum and arsenic
- Surface water: none

Ecological Assessment Constituents:

- Surface soil: 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, aluminum, antimony, antimony
- Groundwater: none
- Surface water: none

Site 10

Human Health Assessment Constituents:

- Surface soil:

VOCs:	2-hexanone
SVOCs:	acenaphthene, anthracene, benzo(a)anthracene, benzo(a)-pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, carbazole, chrysene, dibenzo(a,h)anthracene, dibenzo-furan, diethylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, bis(2-ethylhexyl)phthalate
PCBs:	Aroclor-1254, Aroclor-1260
Metals:	aluminum, cadmium, and TRPH

- Subsurface soil: none
- Groundwater: none

Ecological Assessment Constituents:

- Surface soil: 2-hexanone, butylbenzlphthalate, diethylphthalate, bis(2-ethylhexyl)phthalate, dibenzofuran, carbazole, Aroclor-1254, Aroclor-1260, aluminum, cadmium, vanadium, zinc, and TRPH
- Groundwater: none

The fate and persistence characteristics of these constituents is summarized below by analytical fraction.

SVOCs. SVOCs, in particular PAHs, were the most common CPCs that posed a risk to both human health and the environment. PAHs include benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and dibenzo(a,h)anthracene. PAHs are relatively high molecular weight compounds (e.g., greater than 200 grams per mole [g/mole]) with very low solubility. As a result, PAHs tend to be very persistent in soil with strong sorption capabilities. PAHs have very high K_{oc} values and their fate in the environment is primarily dependent on biodegradation and biotransformation processes by benthic microorganisms or bioaccumulation from intake of groundwater by terrestrial flora and fauna.

PAHs enters the environment primarily through the disposal or burning of petroleum products. Sorption, bioaccumulation, and biodegradation are likely to be competing processes, with the dominant fate being determined by local environmental conditions (ATSDR, 1991a). Any dissolved portion of PAHs is thought to undergo rapid photolysis.

PAH biodegradation in soil is slow since strong adsorption reduces the availability for degradation. Biodegradation is expected to occur under aerobic conditions. PAHs are relatively insoluble; however, they may leach to groundwater in the presence of common organic solvents such as alcohols and ketones. PAHs in the water will undergo biodegradation under aerobic conditions. Chemical hydrolysis occurs too slowly to be important (ATSDR, 1991a).

TRPH. TRPH consists of several different VOCs and SVOCs present in petroleum products or their breakdown products. VOCs, being more volatile and having lower

K_{oc} values than SVOCs, are likely to begin volatilization shortly after deposition of the petroleum compound. The remaining SVOCs will have fate behaviors similar to PAHs. Due to the age of the site (approximately 30 years since active usage), the TRPH compounds present at Sites 9 and 10 are most likely heavy hydrocarbons that strongly adhere to organic soil. As a result, the primary fate of TRPH constituents in the soil at Sites 9 and 10 will most likely remain adhered to the soil and will slowly biodegrade under the microbial activity of subsurface soil.

PCBs. Available empirical data suggest that PCBs, especially those with four or more chlorines, are persistent in the environment (ATDSR, 1992). Aroclor-1254 is a high molecular weight PCB (325 g/mole) with a very low solubility. As a result, the fate and persistence of this PCB tends to bind to soil and eventually biodegrade over several years (USEPA, 1979).

Inorganics. Inorganics identified as contributing a risk that exceeded USEPA and FDEP risk assessment criteria are aluminum, antimony, arsenic, cadmium, chromium, iron, vanadium, and zinc. Unlike organics, these elements are persistent because they do not degrade naturally in the environment. Their fate depends on the metabolic and physical or chemical processes prevalent at Sites 9 and 10. Elevated concentrations of aluminum and iron in groundwater have been observed throughout other sites at NAS Whiting Field as well as background sampling locations. Due to the persistence and fate of aluminum and iron throughout the base, the elevated concentrations of aluminum and iron in surface soil and groundwater at Sites 9 and 10 are attributable to the natural occurrence in the environment and not from waste disposal.

Aluminum is the third most common element in the environment, though not generally found in elevated concentrations in groundwater. Aluminum is known to complex readily, and high concentrations present in soil and groundwater are generally due to silt-sized particles of aluminum-containing compounds often present as clays or aluminum hydroxides. Complexing and polymerization of the most common valence state of aluminum, Al^{+3}, represents the predominant transport mechanism for aluminum in the environment.

Antimony is abundantly found in the earth's crust and is commonly used as a hardening alloy for lead storage batteries, cable sheaths, or a bearing/coating metal with semiconductor capabilities. Antimony is very insoluble in water; however, it is soluble under elevated temperatures and oxidizing (e.g., acidic) condition. In reducing conditions, antimony precipitates to the metal form and in the presence of sulfur as an insoluble sulfide. Under high oxidizing conditions, antimony precipitates in the oxide or hydroxide form and settles into bed sediments.

The most common fate process affecting antimony is adsorption. The ionic radius of antimony is similar to that of lead, thus the fate of antimony in the environment is believed to be similar to that of lead (USEPA, 1979). Antimony does not readily bioaccumulate (USEPA, 1979). The adsorption of antimony to clay particles is pH dependent. Adsorption is more effective under acidic conditions, rather than alkaline conditions.

Arsenic has two stable forms in solution in groundwater, arsenate (As^{5+}) and arsenite (As^{3+}). In groundwater with pH ranging from 3 to 7, the monovalent arsenate anion $H_2AsO_4^-$ is the dominant form. Upon entering surface water, via groundwater discharge, arsenic may partition to sediment from solution by hydrous iron oxide adsorption and/or co-precipitation (or a combination of both) with sulfides in the sediment. The Eh and pH conditions of the surface water and sediment govern the effectiveness of these mechanisms (adsorption and co-precipitation) as a sink for arsenic. These mechanisms appear to be the major inorganic factors controlling arsenic concentrations in surface water (Hem, 1992).

Arsenic may be very mobile in the aquatic environment, cycling through the water column, sediment, biota, and air. Most arsenic released into the environment (on the earth's surface) eventually ends up in either sediments (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of arsenic (USEPA, 1979).

Cadmium is persistent in the environment as an ore or mineral. Cadmium is not readily soluble in water, but soluble in acids and alkalies. Cadmium released into the environment from the earth's surface eventually ends up in either sediments (in stream beds or lakes) or in the oceans. Eh and pH conditions largely govern the fate of cadmium (USEPA, 1979).

Chromium is present in minerals predominantly as Cr^{3+}. Dissolved chromium may be present as trivalent cations or as anions in which the oxidation state is Cr^{6+} (hexavalent). Six different ionic forms of chromium are considered to be stable in aqueous systems. The reduced forms are Cr^{3+}, $CrOH^{2+}$, $CrOH^{2+}$, $Cr(OH)_2^{+}$, and $Cr(OH)^{4-}$. Anionic forms present under oxidizing conditions include dichromate $Cr_2O_7^{2-}$ and chromate CrO_4^{2-}. The dissolved forms that predominate in reduced systems between pH 5 and pH 9 probably are $CrOH^{2+}$ and $Cr(OH)_2^{+}$. Concentrations of chromium in natural waters that have not been affected by waste disposal are commonly less than 10 $\mu g/\ell$ (Hem, 1992).

Iron is the second most abundant element in the environment though dissolved concentrations present in groundwater are generally low. The chemical behavior of iron and its solubility depend upon the oxidation intensity and pH of the environmental system in which it is found. Iron exists in two valence states, Fe^{2+} and Fe^{3+}, with the Fe^{2+} or ferrous form the most common form of iron found in solution in the reducing conditions within the groundwater environment. Dissolved iron generally sorbs to sediment and may precipitate as iron hydroxide or may oxidize to form iron oxides and iron oxyhydroxides (USEPA, 1979). Iron also may complex with organic molecules, especially fluvic and humic acids. Aerated or flowing water with a pH in the range of 6.5 to 8.5 should contain little dissolved iron.

Vanadium commonly exists in the V^{3+}, V^{4+}, and V^{5+} valence states. Its aqueous chemistry is quite complex, but overall concentrations seem to be controlled more by availability of a vanadium source, rather than equilibrium considerations. Bioconcentration of vanadium by vegetation has been reported by several researchers.

Zinc, an essential growth element, is persistent in the environment as an ore or mineral. Zinc is not readily soluble in water, but soluble in acids and alkalies. Chemical speciation and bioaccumulation can be predominant fate processes for zinc.

Based on the fate and persistence characteristics of the CPCs, it is expected that off-site migration of contaminants would be limited. Furthermore, organic contaminants, such as PAHs, would be expected to degrade over time at Sites 9 and 10 while the inorganics would tend to be found sorbed to soil and sediment.

8.2.3 Transport of Contaminants This section discusses the transport of chemicals via surface soil, surface water, sediment, and groundwater at Sites 9 and 10.

Surface Soil. Transport of the CPCs in soil is dependent on several factors, as discussed in Section 8.1. The primary agents of migration acting on soil include wind, water, and human activity. Soil can also act as a source medium from which the CPCs are transported to other media. Transport of the CPCs from soil via airborne pathways is not expected to be a major transport mechanism because of the heavy vegetation present at Sites 9 and 10. Vegetative cover is an effective means of limiting airborne migration and erosion of soil. Humans are effective at moving soil and can greatly affect the transport of soil-bound chemicals at hazardous waste sites. Under the current use of Sites 9 and 10, human activity is not a major transport mechanism for the CPCs in soils. This condition may change based on the future use of Sites 9 and 10.

Water can transport soil and CPCs in soil via the mechanisms of overland flow or the leaching of constituents from the soil to groundwater. Soil erosion, the physical transport of soil via surface water runoff, is currently not considered a major mechanism for the transport of the CPCs in soil at Sites 9 and 10 because of (1) the low grade (slope) of the land surface at the two sites, (2) the heavy vegetation at the sites, and (3) the nature of the constituents remaining in the soil at the two sites.

During the period of reported active disposal at Site 9 (1950s to 1960s) and Site 10 (1965 to 1973), the potential for physical transport of both soil and CPCs via runoff could have been a potentially significant mechanism for transport. If pits were excavated into the soil and waste materials were dumped into the pits, heavy precipitation events could have easily moved the unvegetated soil around the pits. Additionally, the possibility exists that the pits overflowed during heavy rain storms, because they were not covered during their operation. The pits are presumed to be backfilled following their periods of use, and the area revegetated. No significant transport of surface soil is expected since revegetation of Sites 9 and 10.

The PAHs, TRPH, PCBs, and metals detected in the soil at Sites 9 and 10 are likely to remain attached to the soil because these CPCs have relatively high organic carbon partitioning coefficients (K_{oc}) and ultimately high soil distribution based on the organic carbon content of site soil. The partitioning behavior explains why the observed constituents are still present in the soil at Sites 9 and 10 and have not leached into the groundwater or washed off site.

Surface Water. The only surface water body associated with Sites 9 and 10 is the ponded area at Site 9. This ponded area is a surface depression that contains standing water only during heavy rain periods. The ponded area is not hydraulically connected to any surface water body, drainage ditch, or wetland area. As a result, infiltration of surface water directly into the soil is the primary transport mechanism for CPCs at Sites 9 and 10.

Currently, transport of the CPCs at Sites 9 and 10 via storm water runoff is not considered possible due to (1) the relatively flat land surface at the sites, (2) high infiltration capacity of surface water at the sites (i.e., high soil porosity), (3) heavy vegetation at Site 2, and (4) tendency of the surface soil contaminants at the sites to remain attached to clays in the soil.

When Sites 9 and 10 were active disposal pits, transport of contaminants via surface water runoff was probably a significant means of contaminant transport. The pits were open to rainfall during its operation, and it is possible that intense rainfall may have caused the pits to overflow. The pits are presumed to be backfilled following their periods of use, and the area revegetated.

Sediment. The transport of sediment at Sites 9 and 10 by the action of humans is not currently a significant transport mechanism, as very little human activity occurs on the site. Transport of sediment in water (by saltation, traction, and suspension) is an unlikely means of sediment transport at Sites 9 and 10.

Groundwater. Migration of contaminants via overland flow is dependent on periodic rainfall events. Therefore, the dominant pathway for CPCs to be transported offsite is groundwater flow. As discussed in Section 5.7, the observed concentrations of the inorganics in unfiltered groundwater at Sites 9 and 10 was affected by turbidity in the groundwater samples at the time of collection. The groundwater samples collected in 1996 (during Phase IIB) are thought to be more representative of groundwater conditions at the site. It is probable that particulate material of larger than colloidal sizes does not easily move through the matrix of the aquifer. Colloid-sized material may be transported through the aquifer matrix at flow rates present in the surficial aquifer system at Sites 9 and 10.

Hydrogeology at Sites 9 and 10 is discussed in Section 5.4 of this report. The aquifer present at the site is the surficial (sand-and-gravel) aquifer. The CPCs identified for groundwater (aluminum and arsenic) are associated with the surficial aquifer system. Recharge of the surficial aquifer at Sites 9 and 10 occurs primarily by rainfall infiltration on the sites. Groundwater flow direction in the surficial aquifer at Sites 9 and 10 is primarily to the southeast toward a drainage ditch at Sites 11 and 12 (Figure 5-1 and 5-2). The "Y" drainage ditch begins at Perimeter Road at Site 12 and connects to Big Coldwater Creek approximately 2 miles downstream (Figure 1-2).

Vertical hydraulic gradient data were determined to be mostly in an upward direction (expect the downward direction at Site 11 and 13), which suggests that the southeast area may be considered a discharge zone for groundwater. It is important to note that the presence of upward or downward vertical hydraulic gradients does not mean that flow is actually occurring, only that flow, if it were to occur, would be in a horizontal direction with an upward or downward component. Lithologies present at a site, such as clay or clayey sands, may retard the vertical flow. Vertical hydraulic gradients should be viewed as indicative of a potential, not necessarily as an actual, transport route.

Horizontal hydraulic gradient estimates have been developed for the Southeast disposal area. The gradient was calculated for the period between September 1993 and November 1996 and averaged (Table 5-3). The average hydraulic gradient in the surficial aquifer is 0.0030 ft/ft in a southeast direction.

Hydraulic conductivity testing was completed for the Southeast Disposal Area at monitoring wells WHF-11-3, WHF-13-2S, and WHF-14-2. The average hydraulic conductivity value for the Southeast Disposal Area is 8.38 ft/day (Table 5-5).

Horizontal groundwater seepage velocity calculations have been completed for the surficial aquifer system at the Southeast Disposal Area using available hydraulic information (Section 5.4). The horizontal seepage velocity was calculated by multiplying the hydraulic conductivity (K) by the hydraulic gradient and dividing by the effective porosity (n) as shown in Table 5-6. The average linear pore water velocity (i.e., seepage velocity) for the Southeast Disposal Area sites was 27 ft/yr.

Disposal activities at Sites 9 and 10 may have begun releasing contaminants to the aquifer approximately 30 to 40 years ago. Using a horizontal seepage velocity of 27 ft/yr multiplied by a 40-year timeframe, the total distance of potential contaminant migration is estimated to be approximately 1,068 feet.

Using the seepage velocity presented above would most likely overestimate the transport of potential contaminants from the site because it does not account for dilution, advection, dispersion, or adsorption. Dividing either the seepage velocity or the distance by a correction factor of 1.4 (USEPA, 1988b) may provide a more accurate estimate for potential contaminant migration of 770 feet.

The potential contaminant migration of 770 feet relies on hydraulic conductivity values derived from slug test data. Slug tests provide a rough estimate of hydraulic conductivity that can be more accurately measured using pumping tests. Slug data may differ by up to a factor of 10 (Bouwer, 1989). If the hydraulic conductivity value used in the calculation were decreased by an order of magnitude, a total migration of only 77 feet would be expected for the 40-year history of the site.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 CONCLUSIONS. The following conclusions are based on the remedial investigation at Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A), at NAS Whiting Field:

- Soil at Sites 9 and 10 is moderately permeable, fine-graded clayey sand and silty sand, with minor to moderate amounts of humic material. Clay and sand layers were encountered to depths up to 155 feet bls, the maximum depth of the investigation at the sites.

- A geophysical survey suggested the presence of buried wastes at Sites 9 and 10. The survey identified two minor disposal areas at Site 9 and one major disposal area at Site 10.

- The water table is approximately 80 to 92 feet bls at Site 9 and 82 to 87 feet bls at Site 10. The groundwater flow direction is southeast across Sites 9 and 10. The average horizontal seepage velocity for the Southeast Disposal Area sites was approximately 27 ft/yr.

- The pH values of some groundwater samples collected from Sites 9 and 10 monitoring wells were outside the Florida secondary drinking water range of 6.5 to 8.5 SUs.

- The data generated during the RI meet established DQOs and are acceptable for use in site characterization, risk assessment, and evaluation of corrective measures.

- The total ELCR at Site 9, associated with exposure to soil by a hypothetical future resident (3×10^{-5}) exceeded Florida's target risk level of concern (1×10^{-6}) due to arsenic and, therefore, may pose an unacceptable risk. The HI of 4 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1 due to iron, antimony, arsenic, and aluminum.

- The total ELCR at Site 10, associated with exposure to soil by a potential future resident (5×10^{-5}), occupational worker (3×10^{-6}), and trespasser (3×10^{-6}), exceeded Florida's target risk level of concern (1×10^{-6}), due to carcinogenic PAHs and arsenic. The HI of 3 for the total child resident exposure to surface soil exceeded Florida's and USEPA's target HI of 1 due to iron, aluminum, arsenic, TPH, and Aroclor-1254.

- The background levels of arsenic at Site 9 and Site 10 exceed Florida SCTLs and may result in an unacceptable carcinogenic risk.

- Groundwater at Site 9 may pose an unacceptable risk to humans due to arsenic concentration; however, the risk does not exceed the USEPA target risk range. In addition, groundwater for the entire facility has been designated as a separate site, Site 40 facilitywide groundwater. Therefore, the groundwater at Site 9 will be addressed during the forthcoming facilitywide groundwater investigation.

- Direct and indirect ingestion of aluminum in Site 9 surface soil by small mammals resulted in a potential sublethal risk such as reduction in growth and reproduction.

- Potential reduction in the growth and reproduction of small mammals and birds is associated with ingestion of Aroclor-1254, aluminum, cadmium, and zinc in the surface soil and food items at Site 10.

- For terrestrial plants and soil invertebrates, plant biomass, and plant cover are not expected to be reduced at Sites 9 and 10.

- Elevated TRPH concentrations in Site 10 surface soil are the only ecological CPCs detected that may contribute to significant reduction in earthworm growth.

- Groundwater is the dominant transport pathway for migration of CPCs off-site. Based on an average horizontal seepage velocity of 27 ft/yr, approximate 40-year site history and evaluation of hydrogeologic data, a potential migration distance for CPCs is estimated to be approximately 770 feet; however, there is no evidence to support that chemicals are migrating from the site.

- Although groundwater analytical results, summaries, and conclusions are included in the RI report, the groundwater at NAS Whiting Field has been designated as a separate site (Site 40, facilitywide groundwater). Therefore, chemicals in the groundwater that pose a threat to human and ecological receptors will be evaluated as part of the Site 40 RI and FS. The Site 40 assessment will supersede the evaluation presented in this report.

<u>9.2 RECOMMENDATIONS</u>. Based on the conclusions of the remedial investigation, a feasibility study for surface soil is recommended for Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A). No further action is recommended for the subsurface soil and surface water. Groundwater contamination will be addressed in a basewide groundwater investigation under a separate operable unit identified as Site 40.

10.0 PROFESSIONAL REVIEW CERTIFICATION

The work and professional opinions rendered in this report were conducted and developed in accordance with commonly accepted procedures and protocols consistent with applied standards of practice. This report is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are discovered or determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. The remedial investigation for Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A), was developed for NAS Whiting Field in Milton, Florida, and should not be construed to apply for any other purpose or to any other site.

Eric A. Blomberg
Professional Geologist
P.G. No. 1695

Date: 1-18-99

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APPENDIX A

GEOPHYSICAL DATA

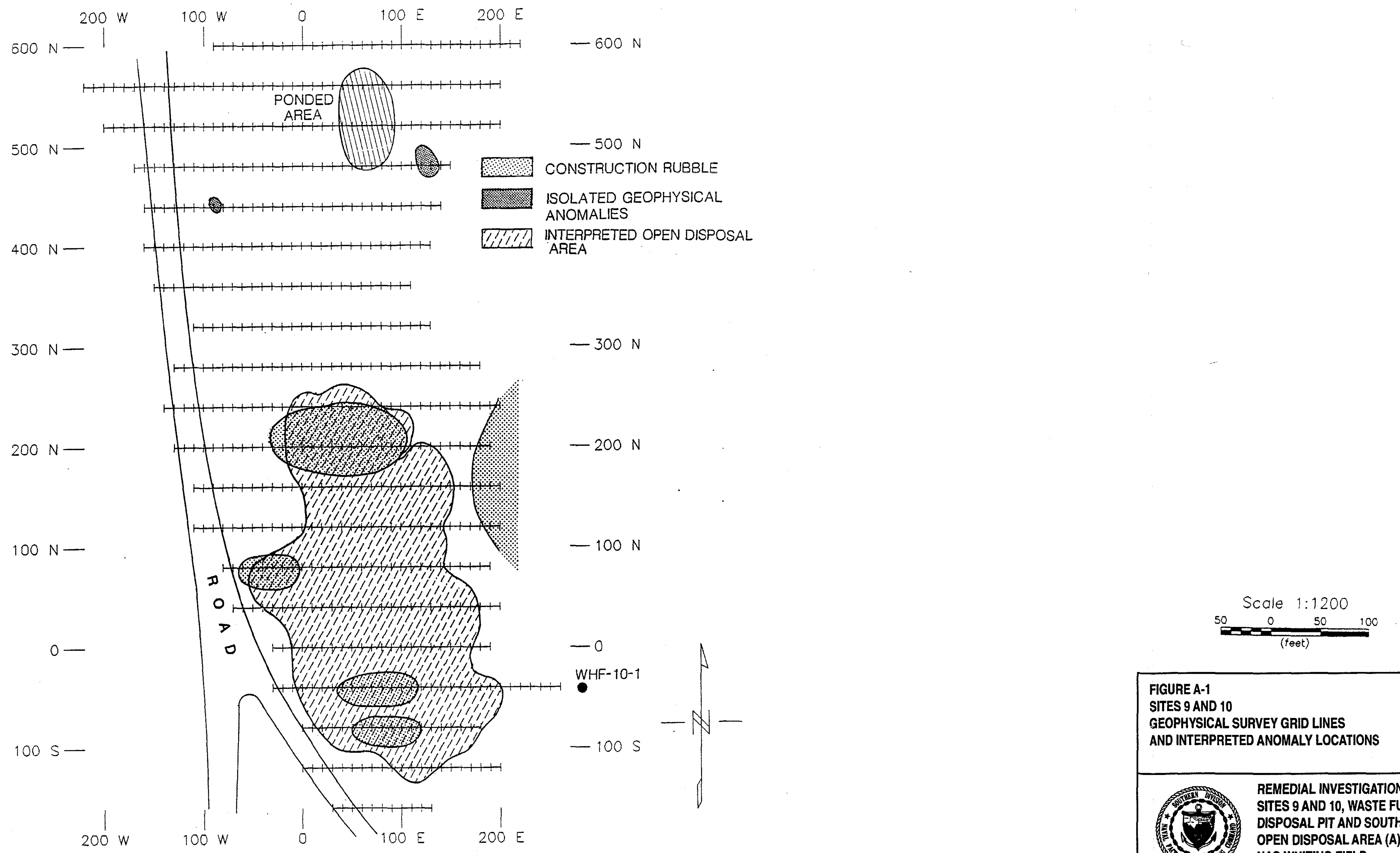

FIGURE A-1
SITES 9 AND 10
GEOPHYSICAL SURVEY GRID LINES AND INTERPRETED ANOMALY LOCATIONS

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL DISPOSAL PIT AND SOUTHEAST OPEN DISPOSAL AREA (A)
NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-1 SITES 9/10 111797MAW

00243HB32

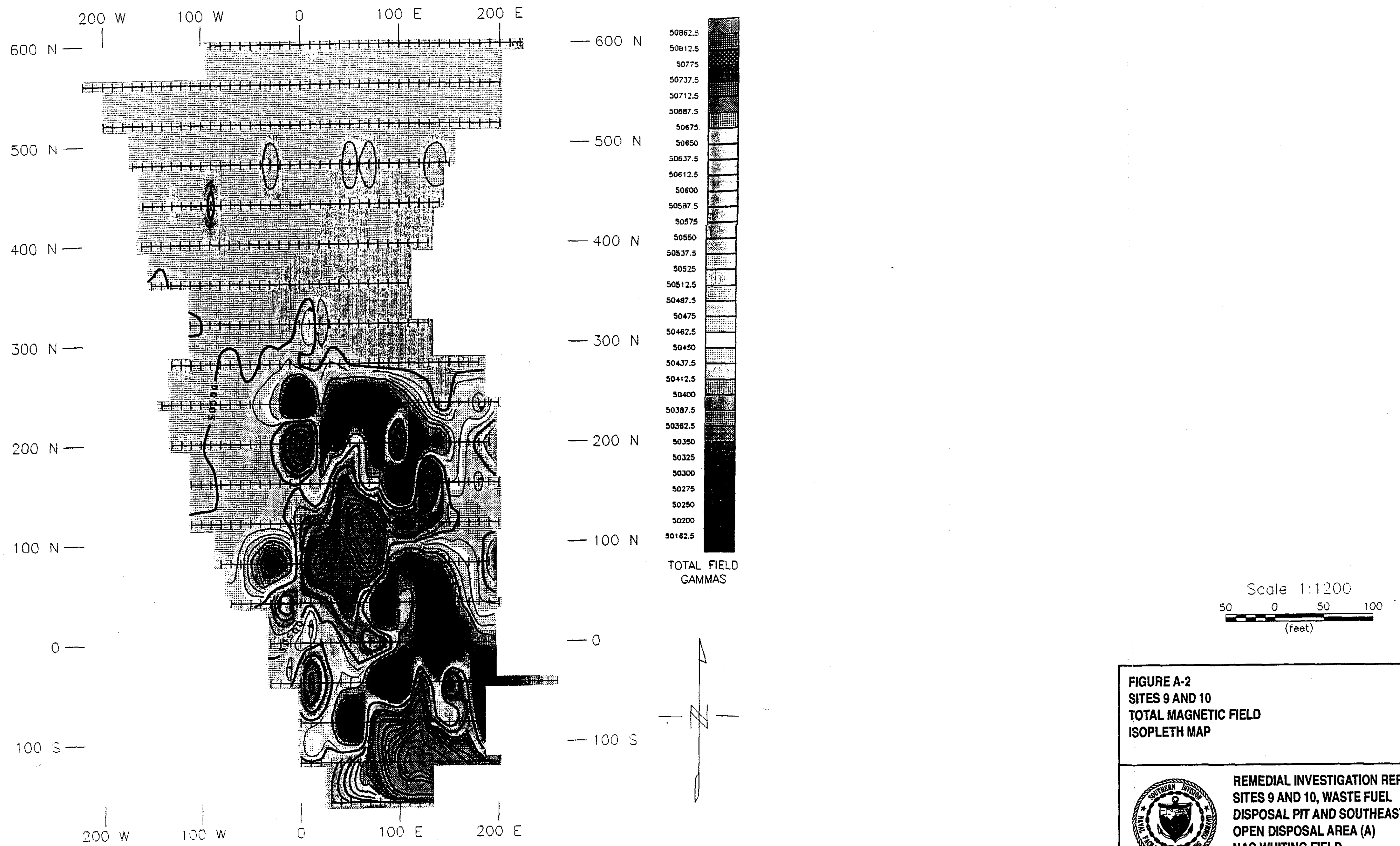

FIGURE A-2
SITES 9 AND 10
TOTAL MAGNETIC FIELD
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL
DISPOSAL PIT AND SOUTHEAST
OPEN DISPOSAL AREA (A)
NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-2 SITES 9/10 111797MAW

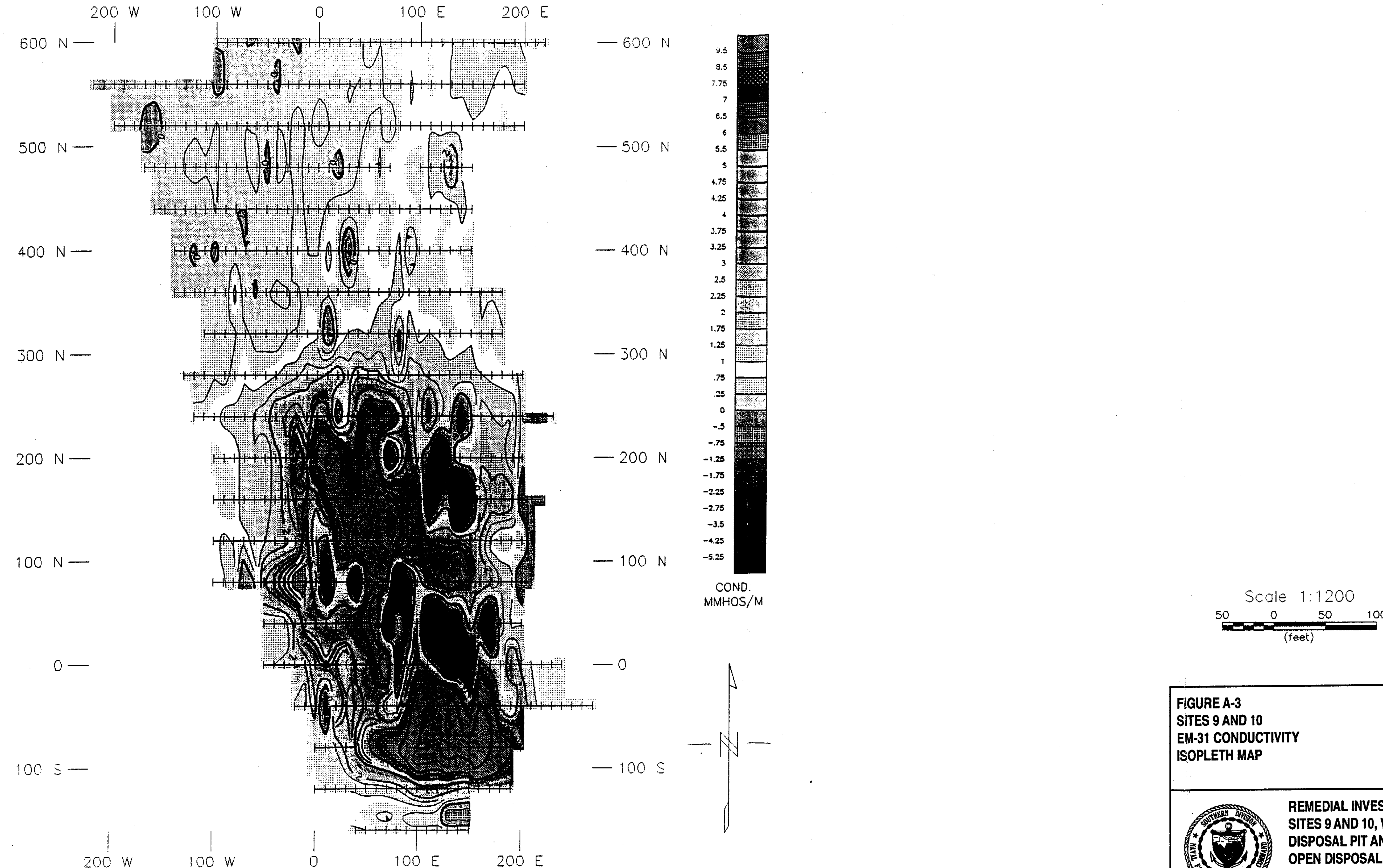

FIGURE A-3
SITES 9 AND 10
EM-31 CONDUCTIVITY
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL
DISPOSAL PIT AND SOUTHEAST
OPEN DISPOSAL AREA (A)
NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-3 SITES 9/10 111797MAW

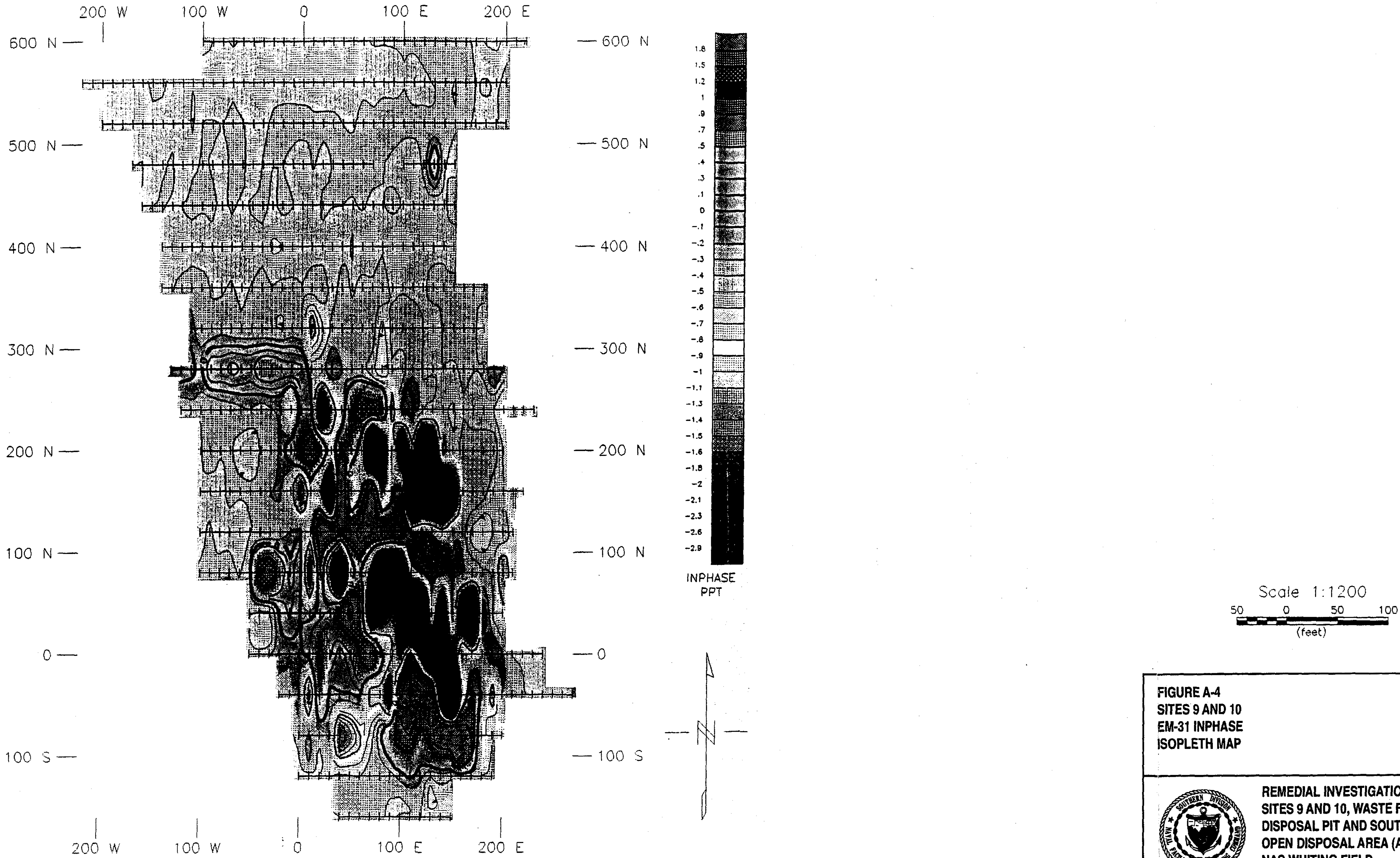

FIGURE A-4
SITES 9 AND 10
EM-31 INPHASE
ISOPLETH MAP

REMEDIAL INVESTIGATION REPORT
SITES 9 AND 10, WASTE FUEL
DISPOSAL PIT AND SOUTHEAST
OPEN DISPOSAL AREA (A)
NAS WHITING FIELD
MILTON, FLORIDA

2534-09 FIGA-4 SITES 9/10 111797MAW

APPENDIX B

QUALITY CONTROL PARCCs REPORT

LABORATORY DATA CONSULTANTS, INC.
7750 El Camino Real, Suite 2C, Carlsbad, CA 92009 Phone: 619 634-0437 Fax: 619 634-0439

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Final Version

5/1/96

APPENDIX A

Table of Contents

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

T[illegible]l

SDG#: WF006	Sample Delivery Group Versus Sample Identification	LDC#: 1779A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
01T00101	G8864001	TB	water	12-5-95	X					
01S00101	G8864002		soil	12-5-95	X	X	X	X	X	
01S00201	G8864003		soil	12-5-95	X	X	X	X	X	
01S00301	G8864004		soil	12-5-95	X	X	X	X	X	
01S00401	G8864005		soil	12-5-95	X	X	X	X	X	
01S00501	G8864006		soil	12-5-95	X	X	X	X	X	
02S00401	G8864007	FD	soil	12-5-95	X	X	X	X	X	
02S00401D	G8864008	FD	soil	12-5-95	X	X	X	X	X	
02S00401DDL	G8864008DL		soil	12-5-95		X				
02T00101	G8876001	TB	water	12-6-95	X					
02S00101	G8876002		soil	12-6-95	X	X	X	X	X	
02S00201	G8876003		soil	12-6-95	X	X	X	X	X	
02S00301	G8876004		soil	12-6-95	X	X	X	X	X	
02S00501	G8876005		soil	12-6-95	X	X	X	X	X	
09S00101	G8876006		soil	12-6-95	X	X	X	X	X	X
09S00201	G8876007		soil	12-6-95	X	X	X	X	X	X
09S00401	G8876008		soil	12-6-95	X	X	X	X	X	X
09S00501	G8876009		soil	12-6-95	X	X	X	X	X	X
09S00301	G8876010	FD	soil	12-6-95	X	X	X	X	X	X
09S00301D	G8876011	FD	soil	12-6-95	X	X	X	X	X	X
01R00101	G8876012	R	water	12-6-95	X	X	X	X	X	X
01F00101	G8876013	SB	water	12-6-95	X	X	X	X	X	X
02S00401MS	G8864007MS	MS	soil	12-5-95	X	X	X	X	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I											
SDG#: WF006				**Sample Delivery Group Versus Sample Identification**							**LDC#:** 1779A
Project Name: NAS Whiting Field				Parameters/Analytical Method							**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**	**TRPH**	
02S00401MSD	G8864007MSD	MSD	soil	12-5-95	X	X	X	X	X		
09S00101MS	G8876006MS	MS	soil	12-6-95						X	
09S00101DUP	G8876006MSD	DUP	soil	12-6-95						X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF007 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
10T00101	G8889001	TB	water	12-7-95	X					
10S00101	G8889002	FD	soil	12-7-95	X	X	X	X	X	X
10S00101R	G8889002R		soil	12-7-95		X				
10S00101D	G8889003	FD	soil	12-7-95	X	X	X	X	X	X
10S00401	G8889004		soil	12-7-95	X	X	X	X	X	X
10S00601	G8889005		soil	12-7-95	X	X	X	X	X	X
12S00301	G8889006		soil	12-7-95	X	X	X	X	X	X
12S00101	G8889007		soil	12-7-95	X	X	X	X	X	X
12S00601	G8889008		soil	12-7-95	X	X	X	X	X	X
10R00101	G8889009	R	water	12-7-95	X	X	X	X	X	X
13T00101	G8895001	TB	water	12-8-95	X					
13S00101	G8895002		soil	12-8-95	X	X	X	X	X	
13S00201	G8895003		soil	12-8-95	X	X	X	X	X	
13S00301	G8895004		soil	12-8-95	X	X	X	X	X	
13S00401	G8895005		soil	12-8-95	X	X	X	X	X	
13S00501	G8895006		soil	12-8-95	X	X	X	X	X	
14S00101	G8895007	FD	soil	12-8-95	X	X	X	X	X	
14S00101D	G8895008	FD	soil	12-8-95	X	X	X	X	X	
14S00201	G8895009		soil	12-8-95	X	X	X	X	X	
14S00301	G8895010		soil	12-8-95	X	X	X	X	X	
10S00101MS	G8889002MS	MS	soil	12-7-95	X		X	X	X	X
10S00101MSD	G8889002MSD	MSD	soil	12-7-95	X		X	X	X	X
10S00101RMS	G8889002RMS	MS	soil	12-7-95		X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF007 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
10S00101RMSD	G8889002RMSD	MSD	soil	12-7-95		X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

SDG#: WF008 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1779C

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00101	G8913001	TB	water	12-9-95	X				
15S02001	G8913002	FD	soil	12-9-95	X	X	X	X	X
15S02001D	G8913003	FD	soil	12-9-95	X	X	X	X	X
15S02101	G8913004		soil	12-9-95	X	X	X	X	X
15S02201	G8913005		soil	12-9-95	X	X	X	X	X
15S02301	G8913006		soil	12-9-95	X	X	X	X	X
15S02401	G8913007		soil	12-9-95	X	X	X	X	X
15S02501	G8913008		soil	12-9-95	X	X	X	X	X
15S01501	G8913009		soil	12-9-95	X	X	X	X	X
15S01401	G8913010		soil	12-9-95	X	X	X	X	X
15S01301	G8913011		soil	12-9-95	X	X	X	X	X
15S01601	G8913012		soil	12-10-95	X	X	X	X	X
15S01701	G8913013	FD	soil	12-10-95	X	X	X	X	X
15S01701D	G8913014	FD	soil	12-10-95	X	X	X	X	X
15S01801	G8913015		soil	12-10-95	X	X	X	X	X
15S01901	G8913016		soil	12-10-95	X	X	X	X	X
15S00901	G8913017		soil	12-11-95	X	X	X	X	X
15S00901RE	G8913017RE		soil	12-11-95		X			
15R00101	G8913020	R	water	12-11-95	X	X	X	X	X
15S02001MS	G8913002MS	MS	soil	12-9-95	X	X	X	X	X
15S02001MSD	G8913002MSD	MSD	soil	12-9-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF009	**Sample Delivery Group Versus Sample Identification**	**LDC#:** 1779D
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
15T00201	G8914001	TB	water	12-11-95	X				
15S00101	G8914002	FD	soil	12-11-95	X	X	X	X	X
15S00101R	G8914002R		soil	12-11-95		X			
15S00101D	G8914003	FD	soil	12-11-95	X	X	X	X	X
15S00201	G8914004		soil	12-11-95	X	X	X	X	X
15S00301	G8914005		soil	12-11-95	X	X	X	X	X
15S00501	G8914006		soil	12-11-95	X	X	X	X	X
15S00401	G8914007		soil	12-11-95	X	X	X	X	X
15S00601	G8914008		soil	12-11-95	X	X	X	X	X
15S00701	G8914009		soil	12-11-95	X	X	X	X	X
15S00801	G8914010		soil	12-11-95	X	X	X	X	X
15S01201	G8914011		soil	12-11-95	X	X	X	X	X
15R00201	G8914012	R	water	12-11-95	X	X	X	X	X
15S01101	G8914013		soil	12-10-95	X	X	X	X	X
15S01001	G8914014		soil	12-10-95	X	X	X	X	X
15S00101MS	G8914002MS	MS	soil	12-11-95	X	X	X	X	X
15S00101MSD	G8914002MSD	MSD	soil	12-11-95	X	X	X	X	X
15S00101RMS	G8914002RMS	MS	soil	12-11-95		X			
15S00101RMSD	G8914002RMSD	MSD	soil	12-11-95		X			

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF010	Sample Delivery Group Versus Sample Identification	LDC#: 1779E
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31S00101	G8924001		soil	12-12-95	X	X	X	X	X
31S00201	G8924002		soil	12-12-95	X	X	X	X	X
31S00301	G8924003		soil	12-12-95	X	X	X	X	X
31S00401	G8924004		soil	12-12-95	X	X	X	X	X
31T00101	G8924005	TB	water	12-12-95	X				
31R00101	G8924006	R	water	12-12-95	X	X	X	X	X
31T00201	G8938001	TB	water	12-13-95	X				
31S01501	G8938002	FD	soil	12-13-95	X	X	X	X	X
31S01501D	G8938003	FD	soil	12-13-95	X	X	X	X	X
31S01601	G8938004		soil	12-13-95	X	X	X	X	X
31S01701	G8938005		soil	12-13-95	X	X	X	X	X
31S01801	G8938006		soil	12-13-95	X	X	X	X	X
31S01901	G8938007		soil	12-13-95	X	X	X	X	X
31S01501MS	G8938002MS	MS	soil	12-13-95	X	X	X	X	X
31S01501MSD	G8938002MSD	MSD	soil	12-13-95	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I										
SDG#: WF11A				**Sample Delivery Group Versus Sample Identification**						**LDC#:** 1777A
Project Name: NAS Whiting Field				Parameters/Analytical Method						**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**	**TRPH**
09W00101	RA903001	FD	water	1-5-96	X	X	X	X	X	X
09W00101D	RA903002	FD	water	1-5-96	X	X	X	X	X	X
16W00101	RA903003		water	1-5-96	X	X	X	X	X	
09W00101MS	RA903001MS	MS	water	1-5-96	X	X	X	X	X	X
09W00101MSD	RA903001MSD	MSD	water	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF11B **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide	TRPH
12T00101	RA847001	TB	water	1-5-96	X					
10S00201	RA847002	FD	soil	1-5-96	X	X	X	X	X	X
10S00201DL	RA847002DL		soil	1-5-96		X				
10S00201D	RA847003	FD	soil	1-5-96	X	X	X	X	X	X
10S00301	RA847004		soil	1-5-96	X	X	X	X	X	X
10S00301R	RA847004R		soil	1-5-96		X				
10S00501	RA847005		soil	1-5-96	X	X	X	X	X	X
12S00201	RA847006		soil	1-5-96	X	X	X	X	X	X
12S00401	RA847007		soil	1-5-96	X	X	X	X	X	X
12S00501	RA847008		soil	1-5-96	X	X	X	X	X	X
12R00101	RA847012	R	water	1-5-96	X	X	X	X	X	X
11T00101	RA847013	TB	water	1-6-96	X					
11S00101	RA847014		soil	1-6-96	X	X	X	X	X	X
11S00201	RA847015		soil	1-6-96	X	X	X	X	X	X
11S00201DL	RA847015DL		soil	1-6-96			X			
11S00201R	RA847015R		soil	1-6-96	X					
11S00501	RA847016		soil	1-6-96	X	X	X	X	X	X
11S00401	RA847017		soil	1-7-96	X	X	X	X	X	X
11S00301	RA847018		soil	1-7-96	X	X	X	X	X	X
10S00201MS	RA847002MS	MS	soil	1-5-96	X	X	X	X	X	X
10S00201MSD	RA847002MSD	MSD	soil	1-5-96	X	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I											
SDG#: WF012			**Sample Delivery Group Versus Sample Identification**							**LDC#:** 1777C	
Project Name: NAS Whiting Field			Parameters/Analytical Method							**Job#:** 8532-20	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/ PCBs**	**Metals**	**Cyanide**	**Lead**	**TCLP Metals**
11S00601	RA855001	FD	soil	1-7-96						X	
11S00601D	RA855002	FD	soil	1-7-96						X	
11S00701	RA855003		soil	1-7-96						X	
11S00801	RA855004		soil	1-7-96						X	
11S00901	RA855005		soil	1-7-96						X	
11S01001	RA855006		soil	1-7-96						X	
11S01101	RA855007		soil	1-7-96						X	
11S01201	RA855008		soil	1-7-96						X	
11S01301	RA855009		soil	1-7-96						X	
31S00401	RA855010		soil	1-7-96	X	X	X	X	X		
31S00501	RA855011	FD	soil	1-7-96	X	X	X	X	X		
31S00501D	RA855012	FD	soil	1-7-96	X	X	X	X	X		
31S00601	RA855013		soil	1-7-96	X	X	X	X	X		
31S00701	RA855014		soil	1-7-96	X	X	X	X	X		
31S01001	RA855015		soil	1-7-96	X	X	X	X	X		
31S01101	RA855016		soil	1-7-96	X	X	X	X	X		
31S00901	RA855017		soil	1-7-96	X	X	X	X	X		
31S00801	RA855018		soil	1-7-96	X	X	X	X	X		
31S01201	RA855019		soil	1-8-96	X	X	X	X	X		
31S01201R	RA855019R		soil	1-8-96	X						
31S01301	RA855020		soil	1-8-96	X	X	X	X	X		
31R00201	RA855021	R	water	1-8-96	X	X	X	X	X		
31S00401	RA857001		soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Ta

SDG#: WF012			Sample Delivery Group Versus Sample Identification								LDC#: 1777C
Project Name: NAS Whiting Field			Parameters/Analytical Method								**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/ PCBs**	**Metals**	**Cyanide**	**Lead**	**TCLP Metals**
31S00501	RA857002	FD	soil	1-7-96							X
31S00501D	RA857003	FD	soil	1-7-96							X
31S00601	RA857004		soil	1-7-96							X
31S00701	RA847005		soil	1-7-96							X
31S01001	RA857006		soil	1-7-96							X
31S01101	RA857007		soil	1-7-96							X
31S00901	RA857008		soil	1-7-96							X
31S00801	RA857009		soil	1-7-96							X
31S01201	RA857010		soil	1-8-96							X
31S01301	RA857011		soil	1-8-96							X
31S00501MS	RA855011MS	MS	soil	1-7-96	X	X	X	X	X		
31S00501MSD	RA855011MSD	MSD	soil	1-7-96	X	X	X	X	X		
31S00501MS	RA857002MS	MS	soil	1-7-96							X
31S00501MSD	RA857002MSD	MSD	soil	1-7-96							X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I

SDG#: WF013 **Sample Delivery Group Versus Sample Identification** **LDC#:** 1777D

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/ PCBs	Metals	Cyanide
16S00101	RA856001	FD	soil	1-8-96	X	X	X	X	X
16S00501	RA856002		soil	1-8-96	X	X	X	X	X
16S00401	RA856003		soil	1-8-96	X	X	X	X	X
16S00901	RA856004		soil	1-8-96	X	X	X	X	X
16S00901R	RA856004R		soil	1-8-96		X			
16S01501	RA856005		soil	1-8-96	X	X	X	X	X
16S00201	RA856006		soil	1-9-96	X	X	X	X	X
16S00301	RA856007		soil	1-9-96	X	X	X	X	X
16S00801	RA856008		soil	1-9-96	X	X	X	X	X
16S00801RE	RA856008RE		soil	1-9-96		X			
16S00601	RA856009		soil	1-9-96	X	X	X	X	X
16S00601DL	RA856009DL		soil	1-9-96		X			
16S01201	RA856010		soil	1-9-96	X	X	X	X	X
16S01301	RA856011		soil	1-9-96	X	X	X	X	X
BKS00301	RA856012		soil	1-9-96	X	X	X	X	X
BKS00101	RA856013		soil	1-9-96	X	X	X	X	X
16S01001	RA856014	FD	soil	1-9-96	X	X	X	X	X
16S01001D	RA856015	FD	soil	1-9-96	X	X	X	X	X
16T00101	RA856016	TB	water	1-9-96	X				
16R00101	RA856017	R	water	1-9-96	X	X	X	X	X
16S00101D	RA856018	FD	soil	1-9-96	X	X	X	X	X
24T00101	RA871001	TB	water	1-10-96	X				
24S00101	RA871002		soil	1-10-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

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SDG#: WF013	Sample Delivery Group Versus Sample Identification								LDC#: 1777D
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/ PCBs**	**Metals**	**Cyanide**
16S01001MS	RA856014MS	MS	soil	1-9-96	X	X	X	X	X
16S01001MSD	RA856014MSD	MSD	soil	1-9-96	X	X	X	X	X
24S00101MS	RA871002MS	MS	soil	1-10-96					X
24S00101MSD	RA871002MSD	MSD	soil	1-10-96					X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table I									
SDG#: WF014			**Sample Delivery Group Versus Sample Identification**					**LDC#:** 1777E	
Project Name: NAS Whiting Field			Parameters/Analytical Method					**Job#:** 8532-20	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
BKR00101	RA870001	R	water	1-10-96	X	X	X	X	X
BKT00101	RA870002	TB	water	1-10-96	X				
16S01401	RA870003		soil	1-10-96	X	X	X	X	X
16S00701	RA870004		soil	1-10-96	X	X	X	X	X
16S01101	RA870005		soil	1-10-96	X	X	X	X	X
16S01701	RA870006		soil	1-10-96	X	X	X	X	X
16S01601	RA870007		soil	1-10-96	X	X	X	X	X
BKS00201	RA870008	FD	soil	1-10-96	X	X	X	X	X
BKS00201D	RA870009	FD	soil	1-10-96	X	X	X	X	X
BKS00501	RA870010		soil	1-10-96	X	X	X	X	X
BKS00401	RA870011		soil	1-10-96	X	X	X	X	X
31B00401	RA870012		soil	1-11-96	X	X	X	X	X
31B00301	RA870013		soil	1-11-96	X	X	X	X	X
31B00201	RA870014	FD	soil	1-11-96	X	X	X	X	X
31B00201D	RA870015	FD	soil	1-11-96	X	X	X	X	X
31B00101	RA870016		soil	1-11-96	X	X	X	X	X
31B00501	RA870017		soil	1-11-96	X	X	X	X	X
31T00201	RA870018	TB	water	1-11-96	X				
BKS00201MS	RA870008MS	MS	soil	1-10-96	X	X	X	X	X
BKS00201MSD	RA870008MSD	MSD	soil	1-10-96	X	X	X	X	X

TB - Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

T I

SDG#: WF015	Sample Delivery Group Versus Sample Identification	LDC#: 1777F
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
COR00101	RA908001	R	water	1-18-96	X	X	X	X	X
COF00101	RA908002	SB	water	1-18-96	X	X	X	X	X
COT00101	RA908003	TB	water	1-18-96	X				
COS00101	RA908004	FD	soil	1-18-96	X	X	X	X	X
COS00101D	RA908005	FD	soil	1-18-96	X	X	X	X	X
EOS00101	RA908006		soil	1-18-96	X	X	X	X	X
POS00101	RA908007		soil	1-18-96	X	X	X	X	X
YOS00101	RA908008		soil	1-18-96	X	X	X	X	X
SOS00101	RA908009		soil	1-18-96	X	X	X	X	X
WOS00101	RA908010		soil	1-18-96	X	X	X	X	X
AOS00101	RA908011		soil	1-18-96	X	X	X	X	X
COS00101MS	RA908004MS	MS	soil	1-18-96	X	X	X	X	X
COS00101MSD	RA908004MSD	MSD	soil	1-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate

Table II
Summary of Rejected Data (Organics)
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF006	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF007	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF008	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF009	Volatiles	All samples	No rejected results	-
	Semivolatiles	15S00201	1,4-Dichlorobenzene 1,2,4-Trichlorobenzene Acenaphthene Pyrene	Low MS/MSD recoveries Low MS/MSD recoveries Low MS/MSD recoveries MS/MSD recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF010	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF11A	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF11B	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF012	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF013	Volatiles	All samples	No rejected results	-
	Semivolatiles	16S00801	All compounds	Low Surrogate recoveries
	Pesticides & PCBs	All samples	No rejected results	-
WF014	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF015	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
	Pesticides & PCBs	COS00101 SOS00101	All compounds All compounds	Low Surrogate recoveries Low Surrogate recoveries

Table III Summary of Rejected Data (Inorganics) Surface Soil Investigation, Phase IIB NAS Whiting Field, Milton Florida				
Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF006	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF007	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF008	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF009	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF010	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF11A	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF11B	All metals Cyanide TRPH	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF012	All metals All TCLP metals Cyanide	All samples All samples All samples	No rejected results No rejected results No rejected results	- -
WF013	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF014	Mercury Cyanide	31B00301 All samples	Mercury No rejected results	Low LCS % Recovery -
WF015	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF006	02S00401	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	92	-	None
		4-Chloro-3-methylphenol	26-103	-	-	104	-	None
		2,4-Dinitrotoluene	28-89	-	-	100	-	None
		Pyrene	35-142	-	29	30	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF007	10S00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	26-103	-	111	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF008	15S02001	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	28-104	≤27	-	14	142	None
		1,2,4-Trichlorobenzene	38-107	≤23	-	12	149	None
		Acenaphthene	-	≤19	-	-	96	None
		2,4-Dinitrotoluene	28-89	-	100	94	-	None
		Pyrene	35-142	≤36	-	6	67	None
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101	Volatiles	-	-	-	-	-	None
		2-Chlorophenol	25-102	≤50	16	-	110	None
		1,4-Dichlorobenzene	28-104	-	0	0	-	R
		1,2,4-Trichlorobenzene	38-107	≤23	0	3	200	R
		Acenaphthene	31-137	≤19	0	9	200	R
		Pentachlorophenol	17-109	≤47	10	-	127	None
		Pyrene	35-142	-	0	0	-	R
		Pesticides & PCBs	-	-	-	-	-	None
WF009	15S00101R	2,4-Dinitrotoluene	28-89	-	-	95	-	UJ

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF010	31S01501	Volatiles	-	-	-	-	-	-
		4-Chloro-3-methylphenol	26-103	-	104	-	-	None
		2,4-Dinitrotoluene	28-89	-	94	-	-	None
		Pesticides & PCBs	-	-	-	-	-	-
WF11A	09W00101	Volatiles	-	-	-	-	-	None
		4-Chloro-3-methylphenol	23-97	-	104	107	-	None
		4-Nitrophenol	10-80	-	117	119	-	None
		2,4-Dinitrophenol	24-96	-	106	107	-	None
		Pentachlorophenol	96-103	-	120	119	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF11B	10S00201	Volatiles	-	-	-	-	-	None
		Pyrene	-	≤36	-	-	39	None
		Pesticides & PCBs	-	-	-	-	-	None
WF012	31S00501	Volatiles	-	-	-	-	-	None
		4-Nitrophenol	11-114	-	120	115	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF013	16S01001	Volatiles	-	-	-	-	-	None
		Phenol	26-90	-	-	96	-	U
		2-Chlorophenol	25-102	-	-	103	-	U
		Pentachlorophenol	17-109	-	-	110	-	U
		Pesticides & PCBs	-	-	-	-	-	None
WF014	BKS00201	Volatiles	-	-	-	-	-	None
		Pentachlorophenol	17-109	-	133	136	-	None
		4-Nitrophenol	11-114	-	-	132	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF015	COS00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides & PCBs	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF006	**Client ID** **Laboratory ID** **Collection Date**	**02S00401** **G8864007** **12/5/95**	**02S00401D** **G8864008** **12/5/95**	
	Volatiles	ND	ND	-
	Semivolatiles	ND	ND	-
	Dieldrin	8.3	8.0	4
	Alpha-chlordane	5.6	5.1	9
	Gamma-chlordane	3.5	2.9	19
WF006	**Client ID** **Laboratory ID** **Collection Date**	**09S00301** **G8876010** **12/6/96**	**09S00301D** **G8876011** **12/6/96**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID** **Laboratory ID** **Collection Date**	**10S00101** **G8889002** **12/7/95**	**10S00101D** **G8889003** **12/7/95**	
	Volatiles	ND	ND	-
	Phenanthrene	280 ug/Kg	1200 ug/Kg	124
	Fluoranthene	660 ug/Kg	2300 ug/Kg	111
	Pyrene	580 ug/Kg	1600 ug/Kg	94
	Benzo(a)anthracene	340 ug/Kg	1200 ug/Kg	112
	Chrysene	500 ug/Kg	1400 ug/Kg	120
	Bis(2-ethylhexyl)phthalate	200 ug/Kg	360U ug/Kg	Not calculable
	Benzo(b)fluoranthene	480 ug/Kg	1300 ug/Kg	92
	Benzo(k)fluoranthene	360 ug/Kg	900 ug/Kg	86
	Benzo(a)pyrene	400 ug/Kg	1000 ug/Kg	86
	Indeno(1,2,3-cd)pyrene	180 ug/Kg	360 ug/Kg	67
	Benzo(g,h,i)perylene	180 ug/Kg	340 ug/Kg	62
	Anthracene	370U ug/Kg	270 ug/Kg	Not calculable
	Carbazole	370U ug/Kg	100 ug/Kg	Not calculable
	Dibenz(a,h)anthracene	370U ug/Kg	170 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF007	**Client ID** **Laboratory ID** **Collection Date**	**14S00101** **G8895007** **12/8/95**	**14S00101D** **G8895008** **12/8/95**	
	Acetone	8 ug/Kg	ND	Not calculable
	Methylene chloride	6 ug/Kg	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Acetone	5 ug/Kg	ND	Not calculable
	Methylene chloride	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Acetone	6 ug/Kg	4 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Acetone	6 ug/Kg	7 ug/Kg	15
	Bis(2-ethylhexyl)phthalate	ND	1700 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Acetone	ND	5 ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Toluene	10U ug/L	1 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Acetone	29 ug/Kg	20 ug/Kg	37
	2-Hexanone	11U ug/Kg	4 ug/Kg	Not calculable
	Phenanthrene	68 ug/Kg	310 ug/Kg	128
	Di-n-butylphthalate	46 ug/Kg	380U ug/Kg	Not calculable
	Fluoranthene	160 ug/Kg	420 ug/Kg	90
	Pyrene	170 ug/Kg	290 ug/Kg	52
	Butylbenzylphthalate	57 ug/Kg	380U ug/Kg	Not calculable
	Benzo(a)anthracene	87 ug/Kg	190 ug/Kg	74
	Chrysene	120 ug/Kg	220 ug/Kg	59
	Bis(2-ethylhexyl)phthalate	3200 ug/Kg	140 ug/Kg	183
	Benzo(a)fluoranthene	150 ug/Kg	200 ug/Kg	28
	Benzo(k)fluoranthene	110 ug/Kg	210 ug/Kg	62
	Benzo(a)pyrene	95 ug/Kg	150 ug/Kg	45
	Indeno(1,2,3-cd)pyrene	58 ug/Kg	56 ug/Kg	4
	Acenaphthene	380U ug/Kg	40 ug/Kg	Not calculable
	Anthracene	380U ug/Kg	54 ug/Kg	Not calculable
	Carbazole	380U ug/Kg	84 ug/Kg	Not calculable
	4,4'-DDT	7.0 ug/Kg	8.9 ug/Kg	24
	Aroclor 1254	340 ug/Kg	390 ug/Kg	14
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Acetone	9 ug/Kg	8 ug/Kg	12
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Acetone	4 ug/Kg	9 ug/Kg	77
	Bis(2-ethylhexyl)phthalate	45 ug/Kg	380U ug/Kg	Not calculable
	4,4'-DDE	3.2 ug/Kg	2.0 ug/Kg	46
	4,4'-DDT	3.8 ug/Kg	2.7 ug/Kg	34
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Acetone	14 ug/Kg	4 ug/Kg	111
	Bis(2-ethylhexyl)phthalate	60 ug/Kg	58 ug/Kg	3
	Dieldrin	33 ug/Kg	60 ug/Kg	58
	4,4'-DDE	13 ug/Kg	22 ug/Kg	51
	4,4'-DDT	6.4 ug/Kg	9.0 ug/Kg	34
	Alpha-chlordane	6.8 ug/Kg	12 ug/Kg	55
	Gamma-chlordane	4.0 ug/Kg	7.9 ug/Kg	66
	Aroclor 1260	48 ug/Kg	110 ug/Kg	78

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF014	**Client ID** **Laboratory ID** **Collection Date**	**BKS00201** **RA870008** **1/10/96**	**BKS00201D** **RA870009** **1/10/96**	
	Acetone	8 ug/Kg	4 ug/Kg	67
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	45 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF014	**Client ID** **Laboratory ID** **Collection Date**	**31B00201** **RA870014** **1/11/96**	**31B00201D** **RA870015** **1/11/96**	
	Acetone	3 ug/Kg	11U ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	370U ug/Kg	48 ug/Kg	Not calculable
	Pesticides & PCBs	ND	ND	-
WF015	**Client ID** **Laboratory ID** **Collection Date**	**COS00101** **RA908004** **1/18/96**	**COS00101D** **RA908005** **1/18/96**	
	Acetone	22 ug/Kg	12U ug/Kg	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF006	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF007	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	10R00101	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF008	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	15S02501	Decachlorobiphenyl	54	60-150	1	UJ (all compounds)
WF009	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides & PCBs	All within QC limits	-	-	None
WF010	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	31S00101	Tetrachloro-m-xylene	57	60-150	1	UJ/J (all compounds)
		Tetrachloro-m-xylene	56	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF11A	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	09W00101	Decachlorobiphenyl	56	60-150	3	UJ (all compounds)
		Decachlorobiphenyl	50	60-150		
	09W00101D	Decachlorobiphenyl	58	60-150		UJ (all compounds)
		Decachlorobiphenyl	51	60-150		
	16W00101	Decachlorobiphenyl	45	60-150		UJ (all compounds)
		Decachlorobiphenyl	40	60-150		
WF11B	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	12R00101	Decachlorobiphenyl	33	60-150	4	UJ (all compounds)
		Decachlorobiphenyl	29	60-150		
	10S00201	Decachlorobiphenyl	56	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	10S00301	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	42	60-150		
	11S00201	Decachlorobiphenyl	50	60-150		UJ/J (all compounds)
WF012	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs	54	60-150	4	UJ (all compounds)
	31R00201	Decachlorobiphenyl	43	60-150		
	31S00901	Decachlorobiphenyl	45	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	40	60-150		
	31S01201	Decachlorobiphenyl	48	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	50	60-150		
	31S01301	Decachlorobiphenyl	46	60-150		UJ (all compounds)

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF013	All samples	Volatiles	All within QC limits	-	-	None
		Semivolatiles				
	16S00801	Nitrobenzene-d5	3	23-120	1	R
		2-Fluorobiphenyl	3	30-115		
		Terphenyl-d14	4	18-137		
		Phenol-d5	2	24-113		
		2-Fluorophenol	2	25-121		
		2,4,6-Tribromophenol	3	19-122		
		2-Chlorophenol-d4	3	20-130		
		1,2-Dichlorobenzene-d4	2	20-130		
		Pesticides & PCBs				
	16R00101	Decachlorobiphenyl	58	60-150	8	UJ (all compounds)
	16S00101D	Tetrachloro-m-xylene	22	60-150		UJ/J (all compounds)
		Tetrachloro-m-xylene	21	60-150		
	16S00301	Tetrachloro-m-xylene	57	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	57	60-150		
		Decachlorobiphenyl	54	60-150		
	16S01001	Decachlorobiphenyl	44	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	41	60-150		
	16S01201	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
	16S01301	Decachlorobiphenyl	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	55	60-150		
	24S00101	Tetrachloro-m-xylene	48	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	46	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	BKS00101	Tetrachloro-m-xylene	56	60-150		UJ (all compounds)
WF014	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	BKR00101	Decachlorobiphenyl	43	60-150	1	UJ (all compounds)
		Decachlorobiphenyl	39	60-150		

Table VI
Summary of Surrogate Recoveries
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF015	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs				
	COR00101	Decachlorobiphenyl	55	60-150	5	UJ (all compounds)
	AOS00101	Tetrachloro-m-xylene	55	60-150		UJ/J (all compounds)
		Decachlorobiphenyl	51	60-150		
		Decachlorobiphenyl	48	60-150		UJ (all compounds
	COS00101D	Tetrachloro-m-xylene	26	60-150		
		Tetrachloro-m-xylene	24	60-150		UJ/J (all compounds)
	WOS00101	Tetrachloro-m-xylene	39	60-150		
		Tetrachloro-m-xylene	37	60-150		
		Decachlorobiphenyl	41	60-150		
		Decachlorobiphenyl	43	60-150		
	YOS00101	Tetrachloro-m-xylene	37	60-150		UJ (all compounds)
		Tetrachloro-m-xylene	36	60-150		
	COS00101	Tetrachloro-m-xylene	7	60-150	2	R (ND compounds)
		Tetrachloro-m-xylene	7	60-150		
	SOS00101	Tetrachloro-m-xylene	2	60-150		R (ND compounds)
		Tetrachloro-m-xylene	1	60-150		
		Decachlorobiphenyl	15	60-150		
		Decachlorobiphenyl	16	60-150		

Notes: J = *estimated value*
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF006	All	Volatiles	-	-	None
	12/7/96	2,4-Dinitrophenol	-	33.1	UJ
	12/8/96	2,4-Dinitrophenol	-	27.0	UJ
	12/11/96	Diethylphthalate	-	30.1	UJ
	12/12/96	Diethylphthalate	-	27.1	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF007	All	Volatiles	-	-	None
	12/12/96	Dimethylphthalate	-	27.1	UJ
	12/15/96	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/15/96	Nitrobenzene	-	30.8	UJ
		2,4-Dinitrophenol	-	41.8	UJ
		4,6-Dinitro-2-methylphenol	-	30.1	UJ
		Pentachlorophenol	-	29.8	UJ
		Benzo(k)fluoranthene	-	26.5	UJ/J
	All	Pesticides & PCBs	-	-	None
WF008	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF009	All	Volatiles	-	-	None
	12/15/95	Nitrobenzene	-	25.6	UJ
		Pentachlorophenol	-	29.6	UJ
	12/31/95	2,4-Dinitrophenol	-	42.0	UJ
		4-Nitrophenol	-	27.3	UJ
		Pentachlorophenol	-	34.8	UJ
		3,3'-Dichlorobenzidine	-	25.9	UJ
		Benzo(b)fluoranthene	-	27.7	UJ
	All	Pesticides & PCBs	-	-	None

Table VII Summary of Compounds Exceeding Instrument Calibration Surface Soil Investigation, Phase IIB NAS Whiting Field, Milton Florida					
Organic Compounds					
SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF010	All	Volatiles	-	-	None
	12/27/95	4-Nitrophenol	-	28.1	UJ
		Benzo(b)fluoranthene	-	31.4	UJ
		Indeno(1,2,3-cd)pyrene	-	32.8	UJ
	11/30/95	Alpha-BHC	21.7	-	UJ
	11/30/95	Alpha-BHC	20.3	-	UJ
WF11A	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
	1/10/96	Endosulfan I	22	-	UJ
WF11B	1/10/96	Acetone	-	40.0	UJ/J
		2-Butanone	-	37.3	UJ
		4-Methyl-2-pentanone	-	37.7	UJ
		2-Hexanone	-	41.0	UJ/J
	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ/J
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ/J
	1/10/96	Endosulfan I	22	-	UJ
WF012	1/11/96	Trichloroethene	-	27.7	UJ
		2-Hexanone	-	50.9	UJ
		1,1,2,2-Tetrachloroethane	-	34.2	UJ
	1/12/96	2-Hexanone	-	48.4	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	All	Semivolatiles	-	-	None
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF013	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/17/96	2-Hexanone	41.7	-	UJ
	1/13/96	Chloromethane	-	27.2	UJ
		Vinyl chloride	-	27.2	UJ
		Acetone	-	68.1	UJ/J
		2-Butanone	-	69.9	UJ
		1,2-Dichloroethane	-	29.6	UJ
		4-Methyl-2-pentanone	-	31.4	UJ
	1/15/96	Chloroethane	-	26.3	UJ
		Acetone	-	51.7	UJ/J
		2-Butanone	-	40.8	UJ
		1,2-Dichloroethane	-	35.4	UJ
	1/18/96	2-Hexanone	-	27.5	UJ
	1/22/96	Chloromethane	-	41.8	UJ
		Vinyl chloride	-	37.1	UJ
		Chloroethane	-	41.7	UJ
		Acetone	-	31.7	UJ/J
		Carbon disulfide	-	25.8	UJ
		2-Hexanone	-	38.4	UJ
	1/19/96	Benzo(g,h,i)perylene	-	29.0	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ
WF014	1/15/96	1,1-Dichloroethene	33.9	-	UJ
		Carbon disulfide	32.8	-	UJ
	1/14/96	Acetone	31.3	-	UJ/J
	1/16/96	Acetone	-	46.7	UJ/J
		Methylene chloride	-	32.3	UJ
		2-Butanone	-	54.2	UJ
		4-Methyl-2-pentanone	-	31.9	UJ
		2-Hexanone	-	60.0	UJ
	1/12/96	Acetone	-	36.7	UJ/J
	1/20/96	Benzo(k)fluoranthene	-	30.7	UJ/J
	1/31/96	4-Nitrophenol	-	38.2	UJ
		4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ/J
	1/17/96	Endosulfan sulfate	24.0	-	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF015	1/17/96	2-Hexanone	41.7	-	UJ
	1/19/96	Chloromethane	-	47.1	UJ
		Vinyl chloride	-	39.0	UJ
		Chloroethane	-	54.7	UJ
		Acetone	-	25.8	UJ/J
		Carbon disulfide	-	45.5	UJ
	1/31/96	4-Nitroaniline	-	27.9	UJ
		Pentachlorophenol	-	29.4	UJ
		Benzo(g,h,i)perylene	-	35.3	UJ
	2/2/96	2-Chlorophenol	-	26.6	UJ
		2-Nitroaniline	-	25.1	UJ
		2,4-Dinitrophenol	-	25.7	UJ
		4-Bromophenyl-phenylether	-	27.2	UJ
		Hexachlorobenzene	-	35.4	UJ
	2/1/96	4-Bromophenyl-phenylether	-	28.4	UJ
		Hexachlorobenzene	-	35.0	UJ
	1/30/96	Endosulfan sulfate	21.0	-	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF006	Volatiles	ND	All samples in SDG WF006
	Pesticides & PCBs	ND	All samples in SDG WF006
	Diethylphthalate	4 ug/L	01R00101 01F00101
	Diethylphthalate	150 ug/Kg	02S00101 02S00201 02S00301 02S00501 09S00101 09S00201 09S00401 09S00501
WF007	Volatiles	ND	All samples in SDG WF007
	Pesticides & PCBs	ND	All samples in SDG WF007
	Diethylphthalate	2 ug/L	10R00101
	Di-n-octylphthalate	230 ug/Kg	13S00101 13S00301 13S00401 13S00501 14S00101D 14S00301
	Di-n-octylphthalate	180 ug/Kg	13S00201 14S00101
WF008	Volatiles	ND	All samples in SDG WF008
	Pesticides & PCBs	ND	All samples in SDG WF008
	Di-n-butylphthalate	280 ug/Kg	15S02001D 15S02101 15S02201 15S01701 15S01701D
WF009	Volatiles	ND	All samples in SDG WF009
	Semivolatiles	ND	All samples in SDG WF009
	Pesticides & PCBs	ND	All samples in SDG WF009
WF010	Volatiles	ND	All samples in SDG WF010
	Di-n-butylphthalate	320 ug/Kg	31S00101 31S00201 31S00301 31S01401 31S01501 31S01501D 31S01601 31S01701 31S01801 31S01901
	Pesticides & PCBs	ND	All samples in SDG WF010

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF11A	Volatiles	ND	All samples in SDG WF11A
	Bis(2-ethylhexyl)phthalate	3 ug/L	09W00101 09W00101D 16W00101
	Pesticides & PCBs	ND	All samples in SDG WF11A
WF11B	Styrene Xylenes (total)	1 ug/L 2 ug/L	11T00101
	Acetone	7 ug/Kg	10S00301 10S00501 11S00101 11S00201 12S00201 12S00401 12S00501
	Acetone	4 ug/Kg	11S00201R 11S00301 11S00401 11S00501
	Bis(2-ethylhexyl)phthalate	3 ug/L	12R00101
	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	69 ug/Kg 37 ug/Kg	10S00301 10S00501 12S00201
	Di-n-butylphthalate	100 ug/Kg	10S00201 10S00201DL 10S00201D 10S00301R 12S00401 12S00501 11S00101
	Pesticides & PCBs	ND	All samples in SDG WF11B
WF012	Xylenes (total) Styrene	2 ug/L 1 ug/L	31R00201
	Acetone	7 ug/Kg	31S00801 31S01201
	Acetone	4 ug/Kg	31S00401 31S00501 31S00501D 31S01201R
	Semivolatiles Pesticides & PCBs	ND ND	All samples in SDG WF12 All samples in SDG WF12
WF013	Xylenes (total) Styrene	2 ug/L 1 ug/L	16T00101 16R00101 24T00101

Table VIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF013	Bis(2-ethylhexyl)phthalate	34 ug/Kg	16S00101 16S00501 16S00401 16S00901
	Bis(2-ethylhexyl)phthalate	46 ug/Kg	16S00901R 16S00201
	Bis(2-ethylhexyl)phthalate	76 ug/Kg	16S00301 16S00801 16S00601 16S00601DL 16S01201 16S01301 BKS00301 16S01001
	Pesticides & PCBs	ND	All samples in SDG WF13
WF014	Toluene	1 ug/Kg	31B00301
	Bis(2-ethylhexyl)phthalate	38 ug/Kg	31B00501
	Pesticides & PCBs	ND	All samples in SDG WF14
WF015	Volatiles	ND	All samples in SDG WF15
	Pesticides & PCBs	ND	All samples in SDG WF15
	Bis(2-ethylhexyl)phthalate	1 ug/L	COR00101 COF00101

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF006	**Client ID:**	**01T00101**		
	Laboratory ID:	**G8864001**		
	Collection Date:	**12/5/95**		
	Type:	**Trip Blank**		
	Acetone		9 ug/L	None
WF006	**Client ID:**	**02T00101**		
	Laboratory ID:	**G8876001**		
	Collection Date:	**12/6/95**		
	Type:	**Trip Blank**		
	Acetone		7 ug/L	None
WF006	**Client ID:**	**01R00101**		
	Laboratory ID:	**G8876012**		
	Collection Date:	**12/6/95**		
	Type:	**Rinsate**		
	Acetone		11 ug/L	None
	Di-n-butylphthalate		8 ug/L	None
	Bis(2-ethyhexyl)phthalate		2 ug/L	None
	Pesticides & PCBs		ND	None
WF006	**Client ID:**	**01F00101**		
	Laboratory ID:	**G8776013**		
	Collection Date:	**12/6/95**		
	Type:	**Source Blank**		
	Acetone		12 ug/L	None
	2-Butanone		2 ug/L	None
	Di-n-butylphthalate		15 ug/L	None
	Pesticides & PCBs		ND	None
WF007	**Client ID:**	**10T00101**		
	Laboratory ID:	**G8889001**		
	Collection Date:	**12/7/95**		
	Type:	**Trip Blank**		
	Acetone		8 ug/L	None
WF007	**Client ID:**	**13T00101**		
	Laboratory ID:	**G8895001**		
	Collection Date:	**12/8/95**		
	Type:	**Trip Blank**		
	Acetone		4 ug/L	None
WF007	**Client ID:**	**10R00101**		
	Laboratory ID:	**G8889009**		
	Collection Date:	**12/7/95**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		15 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF008	**Client ID:** 15T00101 **Laboratory ID:** G8913001 **Collection Date:** 12/9/95 **Type:** Trip Blank		
	Acetone	8 ug/L	None
WF008	**Client ID:** 15R00101 **Laboratory ID:** G8913020 **Collection Date:** 12/11/95 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	3 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF009	**Client ID:** 15T00201 **Laboratory ID:** G8914001 **Collection Date:** 12/11/95 **Trip Blank:** Trip Blank		
	Acetone	19 ug/L	None
WF009	**Client ID:** 15R00201 **Laboratory ID:** G8914012 **Collection Date:** 12/11/95 **Type:** Rinsate		
	Acetone	12 ug/L	None
	Di-n-butylphthalate	4 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF010	**Client ID:** 31T00101 **Laboratory ID:** G8924005 **Collection Date:** 12/12/95 **Type:** Trip Blank		
	Acetone	10 ug/L	None
WF010	**Client ID:** 31T00201 **Laboratory ID:** G8938001 **Collection Date:** 12/13/95 **Type:** Trip Blank		
	Acetone	12 ug/L	None
WF010	**Client ID:** 31R00101 **Laboratory ID:** G8924006 **Collection Date:** 12/12/965 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	7 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF11B	**Client ID:**	**12R00101**		
	Laboratory ID:	**RA847012**		
	Collection Date:	**1/5/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		4 ug/L	None
	Pesticides &PCBs		ND	None
WF11B	**Client ID:**	**12T00101**		
	Laboratory ID:	**RA847001**		
	Collection Date:	**1/5/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF11B	**Client ID:**	**11T00101**		
	Laboratory ID:	**RA847013**		
	Collection Date:	**1/6/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF012	**Client ID:**	**31R00201**		
	Laboratory ID:	**RA855021**		
	Collection Date:	**1/8/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Semivolatiles		ND	None
	Pesticides & PCBs		ND	None
WF013	**Client ID:**	**16T00101**		
	Laboratory ID:	**RA856016**		
	Collection Date:	**1/9/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF013	**Client ID:**	**24T00101**		
	Laboratory ID:	**RA871001**		
	Collection Date:	**1/10/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF013	**Client ID:**	**16R00101**		
	Laboratory ID:	**RA856017**		
	Collection Date:	**1/9/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None

Table IX
Summary of Field Blank Contamination

Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF014	**Client ID:**	**BKT00101**		
	Laboratory ID:	**RA870002**		
	Collection Date:	**1/10/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF014	**Client ID:**	**31T00201**		
	Laboratory ID:	**RA870018**		
	Collection Date:	**1/11/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF014	**Client ID:**	**BKR00101**		
	Laboratory ID:	**RA870001**		
	Collection Date:	**1/10/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF015	**Client ID:**	**COT00101**		
	Laboratory ID:	**RA908003**		
	Collection Date:	**1/18/96**		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF015	**Client ID:**	**COR00101**		
	Laboratory ID:	**RA908001**		
	Collection Date:	**1/18/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None
	Di-n-butylphthalate		5 ug/L	10U ug/L[1]
	Pesticides & PCBs		ND	None
WF015	**Client ID:**	**COF00101**		
	Laboratory ID:	**RA908002**		
	Collection Date:	**1/18/96**		
	Type:	**Source Blank**		
	Volatiles		ND	None
	Di-n-butylphthalate		7 ug/L	None
	Pesticides & PCBs		ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF006	02S00401	Calcium	-	±2205 mg/Kg	-	-	9780 mg/Kg	J
		Nickel	-	±17.6 mg/Kg	-	-	40.8 mg/Kg	J
		Antimony	75-125	-	73.8	-	-	J
		Manganese	75-125	-	73.8	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF007	10S00101	Antimony	75-125	-	65.6	-	-	J
		Barium	75-125	±88.10 mg/Kg	171.0	-	1221 mg/Kg	J
		Manganese	75-125	±6.6 mg/Kg	130.0	-	34.30 mg/Kg	J
		Lead	75-125	-	128.7	-	-	J
		Selenium	75-125	-	56.1	-	-	J
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF008	15S02001	Antimony	75-125	-	68.2	-	-	J
		Mercury	75-125	-	125.3	-	-	J
		Cyanide	-	-	-	-	-	None
WF009	15S00101	Antimony	75-125	-	53.5	-	-	J
WF010	31S01501	Antimony	75-125	-	73.8	-	-	None
		Cyanide	-	-	-	-	-	None
WF11A	09W00101	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None
WF11B	10S00201	All metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
		TRPH	-	-	-	-	-	None

Table X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes								
			Criteria		% Recovery			
SDG	Client ID	Analyte	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF012	31S00501	All metals	-	-	-	-	-	None
		All TCLP metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF013	16S01001	Aluminum	-	≤35	-	-	71.0	J
		Iron	-	≤35	-	-	42.3	J
		Lead	75-125	-	127	-	-	J
		Cyanide	-	-	-	-	-	None
WF014	BKS00201	Aluminum	-	≤35	-	-	35.6	J
		Cyanide	-	-	-	-	-	None
WF015	COS00101	Lead	75-125	-	-46.5	-	-	J
		Cyanide	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF006	**Client ID**	**02S00401**	**02S00401D**	
	Laboratory ID	**G8864007**	**G8864008**	
	Collection Date	**12/5/95**	**12/5/95**	
	Aluminum	9580 mg/Kg	7580 mg/Kg	23
	Arsenic	3.9 mg/Kg	4.0 mg/Kg	3
	Barium	27.7 mg/Kg	15.9 mg/Kg	54
	Beryllium	0.31 mg/Kg	0.13 mg/Kg	81
	Calcium	14900 mg/Kg	9900 mg/Kg	40
	Chromium	13.6 mg/Kg	14.0 mg/Kg	3
	Cobalt	0.53 mg/Kg	ND	Not calculable
	Copper	4.3 mg/Kg	3.8 mg/Kg	12
	Iron	4010 mg/Kg	3880 mg/Kg	3
	Lead	10.9 mg/Kg	11.6 mg/Kg	6
	Magnesium	926 mg/Kg	403 mg/Kg	79
	Manganese	188 mg/Kg	164 mg/Kg	14
	Mercury	0.03 mg/Kg	0.05 mg/Kg	50
	Nickel	3.9 mg/Kg	3.8 mg/Kg	1
	Potassium	377 mg/Kg	142 mg/Kg	91
	Sodium	104 mg/Kg	70.2 mg/Kg	38
	Vanadium	12.9 mg/Kg	11.7 mg/Kg	10
	Zinc	13.1 mg/Kg	12.5 mg/Kg	5
	Cyanide	0.15 mg/Kg	ND	Not calculable
WF006	**Client ID**	**09S00301**	**09S00301D**	
	Laboratory ID	**G8876010**	**G8876011**	
	Collection Date	**12/6/96**	**12/6/96**	
	Aluminum	25200 mg/Kg	33100 mg/Kg	27
	Arsenic	8.5 mg/Kg	7.1 mg/Kg	18
	Barium	8.9 mg/Kg	21.7 mg/Kg	83
	Beryllium	0.12 mg/Kg	0.22 mg/Kg	59
	Calcium	176 mg/Kg	384 mg/Kg	74
	Chromium	21.7 mg/Kg	29.5 mg/Kg	30
	Cobalt	0.52 mg/Kg	0.55 mg/Kg	6
	Copper	6.8 mg/Kg	9.0 mg/Kg	28
	Iron	17800 mg/Kg	26500 mg/Kg	40
	Lead	11.2 mg/Kg	6.6 mg/Kg	52
	Magnesium	143 mg/Kg	227 mg/Kg	45
	Manganese	28.2 mg/Kg	52.9 mg/Kg	61
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	ND	6.1 mg/Kg	Not calculable
	Potassium	ND	212 mg/Kg	Not calculable
	Selenium	0.33 mg/Kg	ND	Not calculable
	Sodium	8.4 mg/Kg	10.4 mg/Kg	21
	Vanadium	43.5 mg/Kg	65.1 mg/Kg	40
	Zinc	6.3 mg/Kg	14.4 mg/Kg	78
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF007	**Client ID**	**10S00101**	**10S00101D**	
	Laboratory ID	**G8889002**	**G8889003**	
	Collection Date	**12/7/95**	**12/7/95**	
	Aluminum	8760 mg/Kg	8920 mg/Kg	2
	Arsenic	2.5 mg/Kg	2.6 mg/Kg	4
	Barium	361 mg/Kg	1320 mg/Kg	114
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Cadmium	0.91 mg/Kg	ND	Not calculable
	Calcium	23200 mg/Kg	17800 mg/Kg	26
	Chromium	18.2 mg/Kg	16.8 mg/Kg	8
	Cobalt	0.83 mg/Kg	2.0 mg/Kg	82
	Copper	7.9 mg/Kg	7.9 mg/Kg	0
	Iron	6520 mg/Kg	6780 mg/Kg	4
	Lead	38.0 mg/Kg	33.1 mg/Kg	14
	Magnesium	5910 mg/Kg	5600 mg/Kg	5
	Manganese	56.6 mg/Kg	66.0 mg/Kg	15
	Mercury	0.07 mg/Kg	0.07 mg/Kg	0
	Nickel	6.8 mg/Kg	3.0 mg/Kg	77
	Potassium	219 mg/Kg	ND	Not calculable
	Sodium	35.6 mg/Kg	46.2 mg/Kg	26
	Vanadium	18.9 mg/Kg	18.7 mg/Kg	1
	Zinc	37.7 mg/Kg	34.1 mg/Kg	5
	Cyanide	0.10 mg/Kg	0.20 mg/Kg	67
	TRPH	240 mg/Kg	180 mg/Kg	29
WF007	**Client ID**	**14S00101**	**14S00101D**	
	Laboratory ID	**G8895007**	**G8895008**	
	Collection Date	**12/8/95**	**12/8/95**	
	Aluminum	11600 mg/Kg	11500 mg/Kg	1
	Arsenic	1.5 mg/Kg	1.9 mg/Kg	23
	Barium	23.3 mg/Kg	26.6 mg/Kg	13
	Beryllium	0.15 mg/Kg	0.16 mg/Kg	6
	Calcium	120 mg/Kg	183 mg/Kg	6
	Chromium	7.8 mg/Kg	7.8 mg/Kg	0
	Cobalt	1.8 mg/Kg	1.6 mg/Kg	12
	Copper	3.8 mg/Kg	4.3 mg/Kg	12
	Iron	6310 mg/Kg	6630 mg/Kg	5
	Lead	7.7 mg/Kg	11.9 mg/Kg	42
	Magnesium	177 mg/Kg	162 mg/Kg	9
	Manganese	521 mg/Kg	597 mg/Kg	14
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	4.1 mg/Kg	4.6 mg/Kg	12
	Potassium	144 mg/Kg	ND	Not calculable
	Sodium	16.4 mg/Kg	14.0 mg/Kg	16
	Vanadium	16.8 mg/Kg	17.4 mg/Kg	6
	Zinc	6.0 mg/Kg	6.6 mg/Kg	10
	Cyanide	0.07 mg/Kg	ND	Not calculable

Table XI Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples Surface Soil Investigation, Phase IIB NAS Whiting Field, Milton Florida				
SDG	Inorganic Analytes			RPD
WF008	**Client ID**	**15S02001**	**15S02001D**	
	Laboratory ID	**G8913002**	**G8913003**	
	Collection Date	**12/9/95**	**12/9/95**	
	Aluminum	4630 mg/Kg	5470 mg/Kg	17
	Arsenic	1.2 mg/Kg	1.1 mg/Kg	9
	Barium	5.6 mg/Kg	6.6 mg/Kg	16
	Beryllium	0.13 mg/Kg	0.13 mg/Kg	0
	Calcium	22.2 mg/Kg	25.2 mg/Kg	13
	Chromium	3.0 mg/Kg	3.7 mg/Kg	21
	Copper	1.9 mg/Kg	2.4 mg/Kg	23
	Iron	2500 mg/Kg	2950 mg/Kg	17
	Lead	5.9 mg/Kg	5.9 mg/Kg	0
	Magnesium	85.0 mg/Kg	107 mg/Kg	23
	Manganese	75.2 mg/Kg	87.1 mg/Kg	15
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	2.4 mg/Kg	9.1 mg/Kg	117
	Selenium	0.26 mg/Kg	ND	Not calculable
	Vanadium	5.7 mg/Kg	7.1 mg/Kg	22
	Zinc	3.0 mg/Kg	4.1 mg/Kg	31
	Cyanide	ND	ND	-
WF008	**Client ID**	**15S01701**	**15S01701D**	
	Laboratory ID	**G8913013**	**G8913014**	
	Collection Date	**12/10/95**	**12/10/95**	
	Aluminum	13700 mg/Kg	9290 mg/Kg	38
	Arsenic	3.7 mg/Kg	4.3 mg/Kg	15
	Barium	4.4 mg/Kg	3.8 mg/Kg	15
	Beryllium	0.11 mg/Kg	0.11 mg/Kg	0
	Calcium	23.7 mg/Kg	20.4 mg/Kg	15
	Chromium	14.8 mg/Kg	14.0 mg/Kg	6
	Copper	2.6 mg/Kg	2.5 mg/Kg	4
	Iron	11900 mg/Kg	10400 mg/Kg	13
	Lead	4.7 mg/Kg	4.1 mg/Kg	14
	Magnesium	51.2 mg/Kg	41.8 mg/Kg	20
	Manganese	10.8 mg/Kg	6.8 mg/Kg	45
	Nickel	ND	3.0 mg/Kg	Not calculable
	Selenium	ND	0.25 mg/Kg	Not calculable
	Vanadium	35.9 mg/Kg	31.8 mg/Kg	12
	Zinc	1.5 mg/Kg	1.1 mg/Kg	31
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF009	**Client ID**	**15S00101**	**15S00101D**	
	Laboratory ID	**G8914002**	**G8914003**	
	Collection Date	**12/11/95**	**12/11/95**	
	Aluminum	9280 mg/Kg	10800 mg/Kg	15
	Arsenic	2.0 mg/Kg	1.9 mg/Kg	5
	Barium	6.6 mg/Kg	7.8 mg/Kg	17
	Beryllium	0.12 mg/Kg	0.13 mg/Kg	8
	Calcium	21.6 mg/Kg	23.9 mg/Kg	10
	Chromium	8.4 mg/Kg	8.0 mg/Kg	5
	Copper	3.4 mg/Kg	3.9 mg/Kg	14
	Iron	5120 mg/Kg	5700 mg/Kg	11
	Lead	4.7 mg/Kg	3.6 mg/Kg	26
	Magnesium	109 mg/Kg	132 mg/Kg	19
	Manganese	36.4 mg/Kg	39.9 mg/Kg	9
	Mercury	0.02 mg/Kg	0.02 mg/Kg	0
	Nickel	5.0 mg/Kg	2.4 mg/Kg	70
	Potassium	169 mg/Kg	ND	Not calculable
	Vanadium	13.3 mg/Kg	15.1 mg/Kg	13
	Zinc	4.1 mg/Kg	5.0 mg/Kg	22
	Cyanide	ND	ND	-
WF010	**Client ID**	**31S01501**	**31S01501D**	
	Laboratory ID	**G8938002**	**G8938003**	
	Collection Date	**12/13/95**	**12/13/95**	
	Aluminum	9620 mg/Kg	8270 mg/Kg	15
	Arsenic	1.4 mg/Kg	1.9 mg/Kg	30
	Barium	14.6 mg/Kg	12.2 mg/Kg	18
	Beryllium	0.17 mg/Kg	0.15 mg/Kg	13
	Calcium	112 mg/Kg	103 mg/Kg	8
	Chromium	6.7 mg/Kg	6.0 mg/Kg	11
	Cobalt	0.80 mg/Kg	1.2 mg/Kg	40
	Copper	5.5 mg/Kg	4.2 mg/Kg	27
	Iron	4730 mg/Kg	4380 mg/Kg	8
	Lead	5.3 mg/Kg	5.4 mg/Kg	2
	Magnesium	154 mg/Kg	114 mg/Kg	30
	Manganese	183 mg/Kg	172 mg/Kg	6
	Mercury	0.01 mg/Kg	0.01 mg/Kg	0
	Nickel	3.9 mg/Kg	3.4 mg/Kg	13
	Potassium	ND	197 mg/Kg	Not calculable
	Vanadium	12.8 mg/Kg	11.3 mg/Kg	12
	Zinc	6.8 mg/Kg	5.0 mg/Kg	30
	Cyanide	ND	ND	-
WF11A	**Client ID**	**09W00101**	**09W00101D**	
	Laboratory ID	**RA903001**	**RA903002**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	123 mg/L	129 mg/L	5
	Arsenic	0.60 mg/L	ND	Not calculable
	Barium	1.1 mg/L	1.3 mg/L	17
	Calcium	760 mg/L	726 mg/L	5
	Iron	118 mg/L	105 mg/L	12
	Magnesium	234 mg/L	236 mg/L	1
	Manganese	12.2 mg/L	12.0 mg/L	2
	Potassium	313 mg/L	298 mg/L	2
	Sodium	904 mg/L	893 mg/L	1
	Zinc	5.4 mg/L	3.8 mg/L	34
	Cyanide	ND	ND	-
	TRPH	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF11B	**Client ID**	**10S00201**	**10S00201D**	
	Laboratory ID	**RA847002**	**RA847003**	
	Collection Date	**1/5/96**	**1/5/96**	
	Aluminum	8960 mg/Kg	5890 mg/Kg	41
	Arsenic	3.6 mg/Kg	2.4 mg/Kg	40
	Barium	9.2 mg/Kg	8.1 mg/Kg	13
	Beryllium	0.10 mg/Kg	0.06 mg/Kg	50
	Cadmium	1.4 mg/Kg	1.3 mg/Kg	7
	Calcium	1320 mg/Kg	779 mg/Kg	51
	Chromium	16.0 mg/Kg	12.2 mg/Kg	27
	Cobalt	0.79 mg/Kg	0.82 mg/Kg	4
	Copper	10.8 mg/Kg	11.5 mg/Kg	6
	Iron	9660 mg/Kg	8650 mg/Kg	11
	Lead	32.5 mg/Kg	29.0 mg/Kg	11
	Magnesium	200 mg/Kg	100 mg/Kg	66
	Manganese	39.3 mg/Kg	36.4 mg/Kg	8
	Nickel	2.0 mg/Kg	ND	Not calculable
	Potassium	69.4 mg/Kg	ND	Not calculable
	Sodium	181 mg/Kg	192 mg/Kg	6
	Vanadium	24.5 mg/Kg	20.8 mg/Kg	16
	Zinc	50.0 mg/Kg	42.9 mg/Kg	15
	Cyanide	0.20 mg/Kg	0.13 mg/Kg	42
	TRPH	105 mg/Kg	66.1 mg/Kg	46
WF012	**Client ID**	**31S00501**	**31S00501D**	
	Laboratory ID	**RA855011**	**RA855012**	
	Collection Date	**1/7/96**	**1/7/96**	
	Aluminum	4500 mg/Kg	6050 mg/Kg	29
	Arsenic	1.3 mg/Kg	1.2 mg/Kg	8
	Barium	6.6 mg/Kg	8.6 mg/Kg	26
	Calcium	143 mg/Kg	146 mg/Kg	2
	Chromium	2.8 mg/Kg	3.8 mg/Kg	30
	Cobalt	ND	1.2 mg/Kg	Not calculable
	Copper	2.2 mg/Kg	3.0 mg/Kg	31
	Iron	2470 mg/Kg	2840 mg/Kg	14
	Lead	3.2 mg/Kg	2.9 mg/Kg	10
	Magnesium	80.1 mg/Kg	138 mg/Kg	53
	Manganese	87.0 mg/Kg	95.3 mg/Kg	9
	Nickel	1.9 mg/Kg	2.2 mg/Kg	15
	Potassium	81.9 mg/Kg	115 mg/Kg	34
	Selenium	0.18 mg/Kg	ND	Not calculable
	Sodium	192 mg/Kg	175 mg/Kg	9
	Vanadium	5.9 mg/Kg	7.2 mg/Kg	20
	Zinc	3.9 mg/Kg	5.2 mg/Kg	28
	Barium, TCLP	0.393 mg/L	0.574 mg/L	37
	Chromium, TCLP	0.0017U mg/L	0.0018 mg/L	Not calculable
	Selenium, TCLP	0.0217U mg/L	0.2351 mg/L	Not calculable
	Cyanide	0.09 mg/Kg	ND	Not calculable
WF012	**Client ID**	**11S00601**	**11S00601D**	
	Laboratory ID	**RA855001**	**RA855002**	
	Collection Date	**1/7/96**	**11/7/96**	
	Lead	19.3 mg/Kg	25.0 mg/Kg	26

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF013	**Client ID**	**16S00101**	**16S00101D**	
	Laboratory ID	**RA856001**	**RA856018**	
	Collection Date	**1/8/96**	**1/8/96**	
	Aluminum	4250 mg/Kg	5480 mg/Kg	25
	Arsenic	0.94 mg/Kg	1.2 mg/Kg	24
	Barium	13.2 mg/Kg	13.6 mg/Kg	3
	Beryllium	0.09 mg/Kg	ND	Not calculable
	Cadmium	0.28 mg/Kg	0.30 mg/Kg	7
	Calcium	210 mg/Kg	173 mg/Kg	19
	Chromium	4.0 mg/Kg	5.8 mg/Kg	37
	Copper	4.8 mg/Kg	3.0 mg/Kg	46
	Iron	2340 mg/Kg	2910 mg/Kg	22
	Lead	7.8 mg/Kg	7.5 mg/Kg	4
	Magnesium	103 mg/Kg	150 mg/Kg	37
	Manganese	185 mg/Kg	151 mg/Kg	20
	Nickel	ND	1.9 mg/Kg	Not calculable
	Potassium	99.6 mg/Kg	141 mg/Kg	34
	Selenium	0.19 mg/Kg	ND	Not calculable
	Sodium	129 mg/Kg	108 mg/Kg	18
	Vanadium	6.8 mg/Kg	8.6 mg/Kg	23
	Zinc	6.4 mg/Kg	6.9 mg/Kg	8
	Cyanide	0.12 mg/Kg	0.12 mg/Kg	0
WF013	**Client ID**	**16S01001**	**16S01001D**	
	Laboratory ID	**RA856014**	**RA856015**	
	Collection Date	**1/9/96**	**1/9/96**	
	Aluminum	2000 mg/Kg	1780 mg/Kg	12
	Arsenic	0.76 mg/Kg	0.64 mg/Kg	17
	Barium	4.9 mg/Kg	4.0 mg/Kg	20
	Cadmium	ND	0.23 mg/Kg	Not calculable
	Calcium	101 mg/Kg	99.8 mg/Kg	1
	Chromium	3.9 mg/Kg	3.3 mg/Kg	16
	Copper	10.2 mg/Kg	8.6 mg/Kg	17
	Iron	1470 mg/Kg	1310 mg/Kg	12
	Lead	13.5 mg/Kg	12.4 mg/Kg	9
	Magnesium	38.5 mg/Kg	29.9 mg/Kg	25
	Manganese	5.6 mg/Kg	4.9 mg/Kg	13
	Mercury	0.20 mg/Kg	0.17 mg/Kg	16
	Potassium	ND	77.6 mg/Kg	Not calculable
	Selenium	0.13 mg/Kg	ND	Not calculable
	Silver	4.1 mg/Kg	3.6 mg/Kg	13
	Sodium	139 mg/Kg	118 mg/Kg	16
	Vanadium	3.4 mg/Kg	3.2 mg/Kg	6
	Zinc	4.1 mg/Kg	3.4 mg/Kg	19
	Cyanide	0.10 mg/Kg	0.17 mg/Kg	52

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF014	**Client ID**	**BKS00201**	**BKS00201D**	
	Laboratory ID	**RA870008**	**RA870009**	
	Collection Date	**1/10/96**	**1/10/96**	
	Aluminum	6640 mg/Kg	4230 mg/Kg	44
	Arsenic	1.6 mg/Kg	0.99 mg/Kg	47
	Barium	11.4 mg/Kg	8.9 mg/Kg	34
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	ND	Not calculable
	Calcium	132 mg/Kg	215 mg/Kg	48
	Chromium	3.4 mg/Kg	2.0 mg/Kg	52
	Cobalt	1.0 mg/Kg	ND	Not calculable
	Copper	3.4 mg/Kg	2.3 mg/Kg	39
	Iron	3340 mg/Kg	2220 mg/Kg	40
	Lead	5.9 mg/Kg	5.1 mg/Kg	15
	Magnesium	124 mg/Kg	72.5 mg/Kg	52
	Manganese	249 mg/Kg	217 mg/Kg	14
	Mercury	0.04 mg/Kg	0.05 mg/Kg	1
	Nickel	2.6 mg/Kg	ND	Not calculable
	Potassium	96.8 mg/Kg	65.8 mg/Kg	38
	Selenium	0.16 mg/Kg	0.14 mg/Kg	13
	Sodium	184 mg/Kg	346 mg/Kg	61
	Thallium	0.16 mg/Kg	ND	Not calculable
	Vanadium	8.1 mg/Kg	5.0 mg/Kg	47
	Zinc	5.6 mg/Kg	3.2 mg/Kg	55
	Cyanide	0.11 mg/Kg	ND	Not calculable
WF014	**Client ID**	**31B00201**	**31B00201D**	
	Laboratory ID	**RA870014**	**RA870015**	
	Collection Date	**1/11/96**	**1/11/96**	
	Aluminum	4360 mg/Kg	4050 mg/Kg	7
	Arsenic	1.0 mg/Kg	1.2 mg/Kg	18
	Barium	4.7 mg/Kg	4.3 mg/Kg	9
	Beryllium	0.05 mg/Kg	ND	Not calculable
	Cadmium	0.21 mg/Kg	0.34 mg/Kg	47
	Calcium	107 mg/Kg	121 mg/Kg	12
	Chromium	2.6 mg/Kg	2.1 mg/Kg	21
	Cobalt	0.76 mg/Kg	ND	Not calculable
	Copper	8.5 mg/Kg	8.4 mg/Kg	1
	Iron	2960 mg/Kg	2750 mg/Kg	7
	Lead	2.9 mg/Kg	2.9 mg/Kg	0
	Magnesium	81.1 mg/Kg	72.0 mg/Kg	12
	Manganese	8.0 mg/Kg	7.5 mg/Kg	7
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	1.8 mg/Kg	1.6 mg/Kg	12
	Potassium	88.8 mg/Kg	114 mg/Kg	25
	Sodium	175 mg/Kg	183 mg/Kg	5
	Vanadium	6.0 mg/Kg	5.3 mg/Kg	12
	Zinc	7.1 mg/Kg	6.4 mg/Kg	10

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF015	**Client ID**	**COS00101**	**COS00101D**	
	Laboratory ID	**RA908004**	**RA908005**	
	Collection Date	**1/18/96**	**1/18/96**	
	Aluminum	1770 mg/Kg	1620 mg/Kg	9
	Arsenic	0.57 mg/Kg	0.29 mg/Kg	65
	Barium	17.3 mg/Kg	11.6 mg/Kg	39
	Beryllium	0.07 mg/Kg	0.10 mg/Kg	35
	Calcium	521 mg/Kg	200 mg/Kg	89
	Chromium	2.0 mg/Kg	1.5 mg/Kg	29
	Copper	5.1 mg/Kg	5.0 mg/Kg	2
	Iron	906 mg/Kg	919 mg/Kg	1.4
	Lead	19.4 mg/Kg	8.9 mg/Kg	74
	Magnesium	142 mg/Kg	51.4 mg/Kg	94
	Manganese	4.9 mg/Kg	5.6 mg/Kg	13
	Sodium	120 mg/Kg	95.6 mg/Kg	23
	Vanadium	2.6 mg/Kg	2.8 mg/Kg	7
	Zinc	11.5 mg/Kg	3.3 mg/Kg	111
	Cyanide	0.12 mg/Kg	0.20 mg/Kg	50

Table XII
Summary of Analytes Exceeding Instrument Calibration
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF006	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF007	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF008	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF009	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF010	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF11A	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF11B	All	All metals	-	-	None
	All	Cyanide	-	-	None
	All	TRPH	-	-	None
WF012	All	All metals	-	-	None
	All	All TCLP metals	-	-	None
	All	Cyanide	-	-	None
WF013	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF014	All	All metals	-	-	None
	All	Cyanide	-	-	None
WF015	All	All metals	-	-	None
	All	Cyanide	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF006	Aluminum Calcium Copper Iron Magnesium Selenium Sodium Zinc	-5.056 mg/Kg -5.002 mg/Kg 0.482 mg/Kg -1.408 mg/Kg -5.504 mg/Kg 0.660 mg/Kg 2.840 mg/Kg 0.344 mg/Kg	All soil samples in SDG WF006
	Aluminum Cobalt Iron Magnesium	-7.772 mg/Kg -0.518 mg/Kg -1.702 mg/Kg -5.232 mg/Kg	All soil samples in SDG WF006
	Copper Iron Magnesium Mercury Selenium Sodium	2.690 ug/L -5.220 ug/L -37.720 ug/L -0.029 ug/L 2.300 ug/L 51.840 ug/L	All water samples in SDG WF006
	Cyanide	ND	All samples in SDG WF006
	TRPH	ND	All samples in SDG WF006
WF007	Barium Calcium Iron Sodium	0.174 mg/Kg 6.280 mg/Kg 1.776 mg/Kg 6.856 mg/Kg	All soil samples in SDG WF007
	Aluminum Beryllium Calcium Cobalt Copper Iron Nickel Sodium Zinc	47.800 ug/L 0.250 ug/L 38.580 ug/L -2.750 ug/L 6.560 ug/L 15.910 ug/L 12.410 ug/L -320.390 ug/L 2.210 ug/L	All water samples in SDG WF007
	Cyanide	ND	All samples in SDG WF007
	TRPH	ND	All samples in SDG WF007
WF008	Aluminum Beryllium Copper Iron Sodium	10.014 mg/Kg 0.068 mg/Kg 0.454 mg/Kg 3.440 mg/Kg -72.604 mg/Kg	All soil samples in SDG WF008
	Aluminum Beryllium Cobalt Copper Iron Nickel Sodium Thallium	5.768 mg/Kg 0.060 mg/Kg -0.428 mg/Kg 0.728 mg/Kg 1.184 mg/Kg 2.284 mg/Kg -74.238 mg/Kg -0.470 mg/Kg	All soil samples in SDG WF008

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF008	Aluminum	47.800 ug/L	All water samples in SDG WF008
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF008
WF009	Aluminum	10.014 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Copper	0.454 mg/Kg	
	Iron	3.440 mg/Kg	
	Sodium	-72.604 mg/Kg	
	Aluminum	5.768 mg/Kg	All soil samples in SDG WF009
	Beryllium	0.068 mg/Kg	
	Cobalt	-0.428 mg/Kg	
	Copper	0.728 mg/Kg	
	Iron	1.184 mg/Kg	
	Nickel	2.284 mg/Kg	
	Sodium	-74.238 mg/Kg	
	Thallium	-0.470 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF009
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF009
WF010	Aluminum	6.602 mg/Kg	All soil samples in SDG WF010
	Beryllium	0.066 mg/Kg	
	Copper	0.482 mg/Kg	
	Iron	1.828 mg/Kg	
	Mercury	-0.008 mg/Kg	
	Sodium	-74.902 mg/Kg	
	Aluminum	47.800 ug/L	All water samples in SDG WF010
	Beryllium	0.250 ug/L	
	Calcium	38.580 ug/L	
	Cobalt	-2.750 ug/L	
	Copper	6.560 ug/L	
	Iron	15.910 ug/L	
	Nickel	12.410 ug/L	
	Sodium	-320.390 ug/L	
	Zinc	2.210 ug/L	
	Cyanide	ND	All samples in SDG WF010

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF11A	Iron	14.610 ug/L	All samples in SDG WF11A
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	ND	All samples in SDG WF11A
	TRPH	ND	All samples in SDG WF11A
WF11B	Iron	14.610 ug/L	All water samples in SDG WF11B
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Aluminum	2.922 mg/Kg	All soil samples in SDG WF11B
	Calcium	10.253 mg/Kg	
	Iron	1.620 mg/Kg	
	Sodium	11.866 mg/Kg	
	Zinc	0.512 mg/Kg	
	Cyanide	ND	All samples in SDG WF11B
	TRPH	ND	All samples in SDG WF11B
WF012	Iron	14.610 ug/L	All water samples in SDG WF12
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.081 mg/Kg	All soil samples in SDG WF12
	Calcium	6.408 mg/Kg	
	Iron	0.684 mg/Kg	
	Sodium	9.938 mg/Kg	
	Zinc	0.321 mg/Kg	
	Arsenic, TCLP	-0.01539 mg/L	All samples in SDG WF12
	Barium, TCLP	0.00054 mg/L	
	Lead, TCLP	-0.02157 mg/L	
	Silver, TCLP	-0.00215 mg/L	
WF013	Iron	14.610 ug/L	All water samples in SDG WF13
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Barium	0.082 mg/Kg	All soil samples in SDG WF13
	Calcium	9.329 mg/Kg	
	Iron	0.799 mg/Kg	
	Lead	0.120 mg/Kg	
	Magnesium	4.111 mg/Kg	
	Potassium	56.814 mg/Kg	
	Sodium	8.614 mg/Kg	
	Zinc	0.240 mg/Kg	

Table XIII
Summary of Method Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF014	Iron	14.610 ug/L	All water samples in SDG WF14
	Nickel	11.200 ug/L	
	Sodium	22.840 ug/L	
	Zinc	2.170 ug/L	
	Cyanide	2.034 ug/L	All water samples in SDG WF14
	Beryllium	-0.049 mg/Kg	All soil samples in SDG WF14
	Calcium	15.945 mg/Kg	
	Iron	0.701 mg/Kg	
	Manganese	0.103 mg/Kg	
	Sodium	14.786 mg/Kg	
	Zinc	0.601 mg/Kg	
WF015	Iron	4.210 ug/L	All water samples in SDG WF15
	Sodium	30.690 ug/L	
	Thallium	0.700 ug/L	
	Zinc	1.400 ug/L	
	Cyanide	2.034 ug/L	
	Aluminum	2.553 mg/Kg	All soil samples in SDG WF15
	Barium	0.093 mg/Kg	
	Beryllium	0.043 mg/Kg	
	Calcium	6.248 mg/Kg	
	Iron	0.759 mg/Kg	
	Sodium	4.452 mg/Kg	
	Zinc	0.365 mg/Kg	

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF006	**Client ID:**	**01R00101**		
	Laboratory ID:	**G8876012**		
	Collection Date:	**12/6/95**		
	Type:	**Rinsate**		
	Calcium		178 ug/L	J
	Sodium		60.6 ug/L	UJ
	Zinc		2.9 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF006	**Client ID:**	**01F00101**		
	Laboratory ID:	**G8776013**		
	Collection Date:	**12/6/95**		
	Type:	**Source Blank**		
	Copper		3.3 ug/L	UJ
	Sodium		113 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF007	**Client ID:**	**10R00101**		
	Laboratory ID:	**G8889009**		
	Collection Date:	**12/7/95**		
	Type:	**Rinsate**		
	Aluminum		52.3 ug/L	UJ
	Barium		0.70 ug/L	J
	Beryllium		0.25 ug/L	UJ
	Calcium		23.0 ug/L	UJ
	Copper		7.1 ug/L	UJ
	Iron		67.3 ug/L	UJ
	Zinc		17.6 ug/L	J
	Cyanide		ND	None
	TRPH		ND	None
WF008	**Client ID:**	**15R00101**		
	Laboratory ID:	**G8913020**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		54.6 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.21 ug/L	UJ
	Calcium		22.6 ug/L	UJ
	Copper		5.0 ug/L	UJ
	Iron		45.4 ug/L	UJ
	Zinc		1.5 ug/L	UJ
	Cyanide		ND	None

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF009	**Client ID:**	**15R00201**		
	Laboratory ID:	**G8914012**		
	Collection Date:	**12/11/95**		
	Type:	**Rinsate**		
	Aluminum		69.8 ug/L	UJ
	Barium		1.0 ug/L	J
	Beryllium		0.29 ug/L	UJ
	Calcium		58.5 ug/L	UJ
	Copper		6.5 ug/L	UJ
	Iron		29.2 ug/L	UJ
	Nickel		48.7 ug/L	U
	Zinc		2.7 ug/L	J
	Cyanide		ND	None
WF010	**Client ID:**	**31R00101**		
	Laboratory ID:	**G8924006**		
	Collection Date:	**12/12/965**		
	Type:	**Rinsate**		
	Aluminum		56.5 ug/L	UJ
	Barium		0.86 ug/L	J
	Beryllium		0.42 ug/L	UJ
	Calcium		18.7 ug/L	UJ
	Copper		5.2 ug/L	UJ
	Iron		35.6 ug/L	UJ
	Zinc		3.2 ug/L	UJ
WF11B	**Client ID:**	**12R00101**		
	Laboratory ID:	**RA847012**		
	Collection Date:	**1/5/96**		
	Type:	**Rinsate**		
	Barium		0.30 ug/L	J
	Calcium		42.3 ug/L	J
	Iron		11.6 ug/L	UJ
	Sodium		24.6 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		ND	None
	TRPH		ND	None
WF012	**Client ID:**	**31R00201**		
	Laboratory ID:	**RA855021**		
	Collection Date:	**1/8/96**		
	Type:	**Rinsate**		
	Copper		1.3 ug/L	UJ
	Iron		21.2 ug/L	UJ
	Sodium		40.3 ug/L	UJ
	Zinc		3.0 ug/L	UJ
WF013	**Client ID:**	**16R00101**		
	Laboratory ID:	**RA856017**		
	Collection Date:	**1/9/96**		
	Type:	**Rinsate**		
	Iron		7.0 ug/L	UJ
	Sodium		30.0 ug/L	UJ
	Zinc		3.4ug/L	UJ

Table XIV
Summary of Field Blank Contamination
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF014	**Client ID:**	**BKR00101**		
	Laboratory ID:	**RA870001**		
	Collection Date:	**1/10/96**		
	Type:	**Rinsate**		
	Calcium		42.3 ug/L	J
	Iron		7.8 ug/L	UJ
	Sodium		31.9 ug/L	UJ
	Zinc		1.8 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COR00101**		
	Laboratory ID:	**RA908001**		
	Collection Date:	**1/18/96**		
	Type:	**Rinsate**		
	Iron		9.1 ug/L	UJ
	Lead		0.60 ug/L	J
	Sodium		58.6 ug/L	UJ
	Thallium		0.70 ug/L	UJ
	Zinc		2.2 ug/L	UJ
	Cyanide		2.0 ug/L	UJ
WF015	**Client ID:**	**COF00101**		
	Laboratory ID:	**RA908002**		
	Collection Date:	**1/18/96**		
	Type:	**Source Blank**		
	Iron		8.9 ug/L	UJ
	Sodium		55.0 ug/L	UJ
	Zinc		2.0 ug/L	UJ

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF006	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF007	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF008	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF009	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	99.5[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF010	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11A	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF11B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
	TRPH	Acceptable	Acceptable	Acceptable	100	Acceptable
WF012	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF013	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	94.4[3]	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF014	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	99.7[3]	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Surface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF015	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	80.0[3]	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]A few samples have results whose concentrations were rejected.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent
TRPH = Total Recoverable Petroleum Hydrocarbons

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Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

08/30/96

APPENDIX A

Table of Contents

Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

T. 1

SDG#: WF016	VALIDATION SAMPLE TABLE	LDC#: 1876A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
BKB00101	RB583001		soil	5-20-96	X	X	X	X	X
BKB00102	RB583002		soil	5-20-96	X	X	X	X	X
BKB00401	RB583003	FD	soil	5-20-96	X	X	X	X	X
BKB00401D	RB583004	FD	soil	5-20-96	X	X	X	X	X
BKB00402	RB583005		soil	5-20-96	X	X	X	X	X
BKB00201	RB583006		soil	5-20-96	X	X	X	X	X
BKB00202	RB583007		soil	5-20-96	X	X	X	X	X
BKR00201	RB583008	R	water	5-20-96	X	X	X	X	X
BKF00101	RB583009	SB	water	5-20-96	X	X	X	X	X
BKT00201	RB583010	TB	water	5-20-96	X				
BKB00301	RB583011		soil	5-21-96	X	X	X	X	X
BKB00302	RB583012		soil	5-21-96	X	X	X	X	X
BKB00501	RB583013		soil	5-21-96	X	X	X	X	X
BKB00502	RB583014		soil	5-21-96	X	X	X	X	X
BKB00601	RB583015		soil	5-21-96	X	X	X	X	X
BKB00602	RB583016	FD	soil	5-21-96	X	X	X	X	X
BKB00602D	RB583017	FD	soil	5-21-96	X	X	X	X	X
BKB00701	RB583018		soil	5-21-96	X	X	X	X	X
BKB00702	RB583019		soil	5-21-96	X	X	X	X	X
BKB00401MS	RB583003MS	MS	soil	5-20-96	X	X	X	X	X
BKB00401MSD	RB583003MSD	MSD	soil	5-20-96	X	X	X	X	X
BKR00201MS	RB583008MS	MS	water	5-20-96				X	
BKR00201MSD	RB583008MSD	MSD	water	5-20-96				X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF016					VALIDATION SAMPLE TABLE				LDC#: 1876A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
BKF00101MS	RB583009MS	MS	water	5-20-96					X
BKF00101MSD	RB583009MSD	MSD	water	5-20-96					X

DRAFT

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Ta

SDG#: WF017 **VALIDATION SAMPLE TABLE** **LDC#:** 1876B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides/PCBs	Metals	Cyanide
31B00601	RB592001	FD	soil	5-21-96	X	X	X	X	X
31B00602	RB592002		soil	5-21-96	X	X	X	X	X
31B00603	RB592003		soil	5-21-96	X	X	X	X	X
31B00604	RB592004		soil	5-21-96	X	X	X	X	X
31B00605	RB592005		soil	5-21-96	X	X	X	X	X
31B00601D	RB592006	FD	soil	5-21-96	X	X	X	X	X
12B00101	RB592007	FD	soil	5-21-96	X	X	X	X	X
12B00101D	RB592008	FD	soil	5-21-96	X	X	X	X	X
12B00102	RB592009		soil	5-21-96	X	X	X	X	X
31B00701	RB592010		soil	5-22-96	X	X	X	X	X
31B00702	RB592011		soil	5-22-96	X	X	X	X	X
31B00703	RB592012		soil	5-22-96	X	X	X	X	X
31B00704	RB592013		soil	5-22-96	X	X	X	X	X
31B00705	RB592014		soil	5-22-96	X	X	X	X	X
31B00801	RB592015		soil	5-22-96	X	X	X	X	X
31B00801DL	RB592015DL		soil	5-22-96	X				
31B00802	RB592016		soil	5-22-96	X	X	X	X	X
31B00803	RB592017		soil	5-22-96	X	X	X	X	X
31B00803DL	RB592017DL		soil	5-22-96	X				
31B00804	RB592018		soil	5-22-96	X	X	X	X	X
31B00804DL	RB592018DL		soil	5-22-96	X				
31B00805	RB592019		soil	5-22-96	X	X	X	X	X
31R00101	RB592020	R	water	5-22-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF017					VALIDATION SAMPLE TABLE				LDC#: 1876B
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides/PCBs**	**Metals**	**Cyanide**
31T00301	RB592021	TB	water	5-22-96	X				
12R00101	RB592022	R	water	5-21-96	X	X	X	X	X
BKT00301	RB592023	TB	water	5-21-96	X				
31B00601MS	RB592001MS	MS	soil	5-21-96	X	X	X	X	X
31B00601MSD	RB592001MSD	MSD	soil	5-21-96	X	X	X	X	X

TB ·ip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF018					VALIDATION SAMPLE TABLE		LDC#: 1876C
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
30B00201	RB602001		soil	5-23-96	X	X	X
30B00202	RB602002	FD	soil	5-23-96	X	X	X
30B00203	RB602003		soil	5-23-96	X	X	X
30B00202D	RB602005	FD	soil	5-23-96	X	X	X
30B00101	RB602006		soil	5-23-96	X	X	X
30B00102	RB602007		soil	5-23-96	X	X	X
30B00103	RB602008		soil	5-23-96	X	X	X
30R00101	RB602010	R	water	5-23-96	X	X	X
30T00101	RB602011	TB	water	5-23-96	X		
30B00202MS	RB602002MS	MS	soil	5-23-96	X	X	X
30B00202MSD	RB602002MSD	MSD	soil	5-23-96	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF019					**VALIDATION SAMPLE TABLE**		**LDC#:** 1876D
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
30B00501	MB047001		soil	6-4-96	X	X	X
30B00502	MB047002	FD	soil	6-4-96	X	X	X
30B00503	MB047003		soil	6-4-96	X	X	X
30B00502D	MB047005	FD	soil	6-4-96	X	X	X
30B00401	MB047006		soil	6-4-96	X	X	X
30B00402	MB047007		soil	6-4-96	X	X	X
30B00403	MB047008		soil	6-4-96	X	X	X
30R00201	MB047010	R	water	6-4-96	X	X	X
30T00201	MB047011	TB	water	6-4-96	X		
30R00301	MB068001	R	water	6-5-96	X	X	X
30T00301	MB068002	TB	water	6-5-96	X		
30F00101	MB068003	SB	water	6-5-96	X	X	X
30B00601	MB068004		water	6-5-96	X	X	X
30B00602	MB068005	FD	soil	6-5-96	X	X	X
30B00603	MB068006		soil	6-5-96	X	X	X
30B00602D	MB068009	FD	soil	6-5-96	X	X	X
30B00301	MB068010		soil	6-5-96	X	X	X
30B00302	MB068011		soil	6-5-96	X	X	X
30B00303	MB068012		soil	6-5-96	X	X	X
30B00303DL	MB068012DL		soil	6-5-96		X	
30B00305	MB068015		soil	6-5-96	X	X	X
30B00502MS	MB047002MS	MS	soil	6-4-96	X	X	X
30B00502MSD	MB047002MSD	MSD	soil	6-4-96	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF019					VALIDATION SAMPLE TABLE		LDC#: 1876D
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
30F00101MS	MB068003MS	MS	soil	6-4-96			X
30F00101MSD	MB068003MSD	MSD	soil	6-4-96			X
30B00601MS	MB068004MS	MS	water	6-5-96			X
30B00601MSD	MB068004MSD	MSD	water	6-5-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF020 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1883A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Lead only
33B00301	MB080001		soil	6-6-96	X	X	X
33B00302	MB080002	FD	soil	6-6-96	X	X	X
33B00303	MB080003		soil	6-6-96	X	X	X
33B00304	MB080004		soil	6-6-96	X	X	X
33B00305	MB080005		soil	6-6-96	X	X	X
33B00305RE	MB080005RE		soil	6-6-96		X	
33B00306	MB080006		soil	6-6-96			X
33B00302D	MB080007	FD	soil	6-6-96	X	X	X
33B00201	MB080008		soil	6-6-96	X	X	X
33B00202	MB080009		soil	6-6-96	X	X	X
33B00203	MB080010		soil	6-6-96	X	X	X
33B00205	MB080011		soil	6-6-96			X
33B00101	MB080012		soil	6-6-96	X	X	X
33B00102	MB080013	FD	soil	6-6-96	X	X	X
33B00103	MB080014		soil	6-6-96	X	X	X
33B00102D	MB080015	FD	soil	6-6-96	X	X	X
33R00101	MB080016	R	water	6-6-96	X	X	X
33T00101	MB080017	TB	water	6-6-96	X		
33B00302MS	MB080002MS	MS	soil	6-6-96	X	X	
33B00302MSD	MB080002MSD	MSD	soil	6-6-96	X	X	
33B00302MSRE	MB080002MSRE	MS	soil	6-6-96		X	
33B00302MSDRE	MB080002MSDRE	MSD	soil	6-6-96		X	
33B00302S	MB080002S	MS	soil	6-6-96			X

TB "rip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

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SDG#: WF020					VALIDATION SAMPLE TABLE		LDC#: 1883A
Project Name: NAS Whiting Field					Parameters/Analytical Method		**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Lead only**
33B00302D	MB080002D	DUP	soil	6-6-96			X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WHF021 **VALIDATION SAMPLE TABLE** **LDC#:** 1883B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	TCLP Metals
30U00101	MB107001		soil	6-11-96	X
30U00201	MB107002		soil	6-11-96	X
30U00301	MB107003		soil	6-11-96	X
30U00401	MB107004		soil	6-11-96	X
33U00101	MB107005		soil	6-11-96	X
33U00201	MB107006		soil	6-11-96	X
33U00301	MB107007		soil	6-11-96	X

TE [illegible]p Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matri[illegible]ke, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF016	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF017	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF018	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF019	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
WF020	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -

Table III
Summary of Rejected Data (Inorganics)
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Fraction	Sample	Analyte	Reason
WF016	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF017	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF018	Lead	All samples	No rejected results	-
WF019	Lead	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF016	BKB00401	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF017	31B00601	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	≤38	33	-	45	None
		1,2,4-Trichlorobenzene	38-107	≤23	33	-	43	None
		Phenol	-	≤35	-	-	40	None
		1,4-Dichlorobenzene	-	≤27	-	-	44	None
		4-Chloro-3-methylphenol	-	≤33	-	-	38	None
		Acenaphthene	-	≤19	-	-	30	None
		Pesticides/PCBs	-	-	-	-	-	None
WF018	30B00203	Volatiles	-	-	-	-	-	None
		N-Nitroso-di-n-propylamine	41-126	-	33	34	-	UJ
		1,2,4-Trichlorobenzene	38-107	-	35	35	-	UJ
		Pyrene	35-142	-	33	-	-	UJ
WF019	30B00502	Volatiles	-	-	-	-	-	None
		1,4-Dichlorobenzene	-	≤27	-	-	40	UJ
		1,2,4-Trichlorobenzene	-	≤23	-	-	34	UJ
		Acenaphthene	-	≤19	-	-	25	UJ
WF020	33B00302	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF016	**Client ID** **Laboratory ID** **Collection Date**	**BKB00401** **RB583003** **5/20/96**	**BKB00401D** **RB583004** **5/20/96**	
	Acetone	6 ug/Kg	17 ug/Kg	96
	Di-n-butylphthalate	1000 ug/Kg	970 ug/Kg	3
	Pesticides/PBs	ND	ND	-
WF016	**Client ID** **Laboratory ID** **Collection Date**	**BKB00602** **RB583016** **5/21/96**	**BKB00602D** **RB583017** **5/21/96**	
	Acetone	47 ug/Kg	6 ug/Kg	155
	Di-n-butylphthalate	580 ug/Kg	310 ug/Kg	61
	Pesticides/PCBs	ND	ND	-
WF017	**Client ID** **Laboratory ID** **Collection Date**	**31B00601** **RB592001** **5/21/96**	**31B00601D** **RB592006** **5/21/96**	
	Acetone	3 ug/Kg	11 ug/Kg	114
	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	39 ug/Kg 110 ug/Kg	350U ug/Kg 79 ug/Kg	Not calculable 33
	Gamma-chlordane	1.5 ug/Kg	1.1 ug/Kg	31
WF017	**Client ID** **Laboratory ID** **Collection Date**	**12B00101** **RB592007** **5/21/96**	**12B00101D** **RB592008** **5/21/96**	
	Acetone	8 ug/Kg	3 ug/Kg	91
	Diethylphthalate	830 ug/Kg	370U ug/Kg	Not calculable
	Pesticides/PCBs	ND	ND	-
WF018	**Client ID** **Laboratory ID** **Collection Date**	**30B00202** **RB602002** **5/23/96**	**30B00202D** **RB602005** **5/23/96**	
	Acetone Methylene chloride Di-n-butylphthalate	7 ug/Kg 1 ug/Kg 380U ug/Kg	9 ug/Kg 2 ug/Kg 360 ug/Kg	25 67 Not calculable
WF019	**Client ID** **Laboratory ID** **Collection Date**	**30B00502** **MB047002** **6/4/96**	**30B00502D** **MB047005** **6/4/96**	
	Acetone Methylene chloride Trichloroethene	16 ug/Kg 2 ug/Kg ND	14 ug/Kg 2 ug/Kg 1 ug/Kg	13 0 Not calculable
	Bis(2-ethylhexyl)phthalate 2-Methylnaphthalene	1000 ug/Kg 1900U ug/Kg	970 ug/Kg 210 ug/Kg	3 Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Acetone	23 ug/Kg	31 ug/Kg	30
	Methylene chloride	5 ug/Kg	4 ug/Kg	22
	Trichloroethene	ND	1	Not calculable
	Di-n-butylphthalate	51 ug/Kg	43 ug/Kg	17
	Bis(2-ethylhexyl)phthalate	99 ug/Kg	42 ug/Kg	81
WF020	**Client ID**	**33B00302**	**33B00302D**	
	Laboratory ID	**MB080002**	**MB08007**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	7 ug/Kg	8 ug/Kg	13
	Methylene chloride	ND	2 ug/Kg	Not calculable
	1,2-Dichloroethene (total)	ND	4 ug/Kg	Not calculable
	Trichloroethene	ND	13 ug/Kg	Not calculable
	Bis(2-ethylhexyl)phthalate	48 ug/Kg	380U ug/Kg	Not calculable
WF020	**Client ID**	**33B00102**	**33B00102D**	
	Laboratory ID	**MB080013**	**MB080015**	
	Collection Date	**6/6/96**	**6/6/96**	
	Acetone	5 ug/Kg	5 ug/Kg	0
	Methylene chloride	ND	1 ug/Kg	Not calculable
	Di-n-butylphthalate	66 ug/Kg	45 ug/Kg	21
	Bis(2-ethylhexyl)phthalate	760 ug/Kg	370U ug/Kg	Not calculable

Table VI
Summary of Surrogate Recoveries
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF016	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
	All samples	Pesticides/PCBs	All within QC limits	-	-	None
WF017	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			6	
	12R00101	Decachlorobiphenyl	57	60-150		UJ (all detects)
		Decachlorobiphenyl	56	60-150		UJ (all detects)
	31R00101	Decachlorobiphenyl	27	60-150		UJ (all detects)
		Decachlorobiphenyl	27	60-150		UJ (all detects)
	12B00101D	Tetrachloro-m-xylene	58	60-150		UJ (all detects)
	12B00102	Tetrachloro-m-xylene	55	60-150		UJ (all detects)
		Tetrachloro-m-xylene	56	60-150		UJ (all detects)
	31B00603	Tetrachloro-m-xylene	46	60-150		UJ (all detects)
		Decachlorobiphenyl	54	60-150		UJ (all detects)
		Tetrachloro-m-xylene	49	60-150		UJ (all detects)
		Decachlorobiphenyl	53	60-150		UJ (all detects)
	31B00604	Tetrachloro-m-xylene	52	60-150		UJ (all detects)
		Decachlorobiphenyl	58	60-150		UJ (all detects)
		Tetrachloro-m-xylene	54	60-150		UJ (all detects)
WF018	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF019	All samples	Volatiles	All within QC limits	-	-	None
	All samples	Semivolatiles	All within QC limits	-	-	None
WF020	All samples	Volatiles	All within QC limits	-	-	None
	33B00305	Semivolatiles			1	
		2-Fluorophenol	0	25-121		R (all compounds)
		Phenol-d5	0	24-113		R (all compounds)
		2-Chlorophenol-d4	0	20-130		R (all compounds)
		1,2-Dichlorobenzene-d4	0	20-130		R (all compounds)
		Nitrobenzene-d5	0	23-120		R (all compounds)
		2-Fluorobiphenyl	0	30-115		R (all compounds)
		2,4,6-Tribromophenol	0	19-122		R (all compounds)
		Terphenyl-d14	0	18-137		R (all compounds)

Notes: *J = estimated value*
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF016	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF017	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/2/96	Chloromethane	-	37.6	UJ
	6/3/96	Chloromethane	-	33.4	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/4/96	Chloromethane	-	62.2	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
	6/7/96	Butylbenzylphthalate	-	26.8	UJ
		3,3'-Dichlorobenzidine	-	32.9	UJ
		Bis(2-ethylhexyl)phthalate	-	27.4	UJ
	6/12/96	Endrin aldehyde	21.4	-	J
WF018	5/31/96	Chloromethane	48.8	26.5	UJ
	6/1/96	Chloromethane	42.0	-	UJ
	6/4/96	Chloromethane	-	64.3	UJ
		Chloroethane	-	37.9	UJ
	6/6/96	4-Nitroaniline	-	29.2	UJ
		Di-n-octylphthalate	-	25.2	UJ
WF019	All	Volatiles	-	-	None
	6/11/96	Hexachlorobenzene	-	30.8	UJ

Table VII
Summary of Compounds Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Criteria		Qualifier
			Initial Calibration %RSD	Continuing Calibration %D	
WF020	All	Volatiles	-	-	None
	6/26/96	Bis(2-ethylhexyl)phthalate	-	28.6	UJ
		Di-n-octylphthalate	-	33.8	UJ

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF016	Acetone	2 ug/Kg	BKB00101 BKB00401 BKB00401D BKB00402 BKB00201 BKB00202 BKB00301 BKB00302 BKB00501 BKB00502 BKB00601 BKB00602
	Acetone	1 ug/Kg	BKB00602D
	Bis(2-ethylhexyl)phthalate	12 ug/L	BKR00201 BKF00101
	Pesticides/PCBs	ND	-
WF017	Acetone	1 ug/Kg	31B00601 31B00605 12B00101 12B00101D 12B00102 31B00702 31B00703 31B00704 31B00705 31B00801 31B00802 31B00803
	Acetone	2 ug/Kg	31B00701 31B00804 31B00805
	Acetone	2 ug/Kg	31B00803DL 31B00804DL
	Bis(2-ethylhexylphthalate	2 ug/L	31R00101
	Bis(2-ethylhexylphthalate	2 ug/L	12R00101
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF018	Acetone	2 ug/Kg	30B00201 30B00203
	Acetone	2 ug/Kg	30B00202 30B00202D 30B00101 30B00102 30B00103
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	30B00201 30B00202 30B00203 30B00202D 30B00101 30B00102 30B00103
WF019	Methylene chloride Acetone	5 ug/Kg 5 ug/Kg	30B00501 30B00502 30B00503 30B00502D 30B00401 30B00402 30B00403
	Acetone	5 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00305
	Bis(2-ethylhexyl)phthalate	1 ug/L	30R00201
	Bis(2-ethylhexyl)phthalate	59 ug/Kg	30B00601 30B00602 30B00603 30B00602D 30B00301 30B00302 30B00303 30B00303DL 30B00305

Table VIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF020	Acetone	5 ug/Kg	33B00301 33B00302 33B00303 33B00304 33B00305 33B00302D 33B00201 33B00202 33B00203 33B00101 33B00102 33B00103 33B00102D
	Bis(2-ethylhexyl)phthalate	6 ug/L	33R00101
	Bis(2-ethylhexyl)phthalate	43 ug/Kg	33B00301 33B00302 33B00303 33B00304 33B00302D 33B00201 33B00202 33B00203 33B00101 33B00102 33B00103 33B00102D
	Bis(2-ethylhexylphthalate	300 ug/Kg	33B00305RE

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF016	**Client ID:** BKR00201 **Laboratory ID:** RB583008 **Collection Date:** 5/20/96 **Type:** Equipment Rinsate		
	Acetone	2 ug/L	None
	Di-n-butylphthalate	8 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF016	**Client ID:** BKT00201 **Laboratory ID:** RB583010 **Collection Date:** 5/20/96 **Type:** Trip Blank		
	Methylene chloride	1 ug/L	None
	Acetone	13 ug/L	None
WF016	**Client ID:** BKF00101 **Laboratory ID:** RB583009 **Collection Date:** 5/20/96 **Type:** Source Blank		
	Acetone	23 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 12R00101 **Laboratory ID:** RB592022 **Collection Date:** 5/21/96 **Type:** Rinsate		
	Acetone	8 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
	Bis(2-ethylhexyl)phthalate	15 ug/L	15U ug/L[1]
	Butylbenzylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF017	**Client ID:** 31R00101 **Laboratory ID:** RB592020 **Collection Date:** 5/22/96 **Type:**		
	Acetone	17 ug/L	None
	Di-n-butylphthalate	6 ug/L	None
	Bis(2-ethylhexyl)phthalate	6 ug/L	10U ug/L[1]
	Pesticides/PCBs	ND	None

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF017	**Client ID:** 31T00301 **Laboratory ID:** RB592021 **Collection Date:** 5/22/96 **Type:** Trip Blank		
	Acetone	4 ug/L	None
WF017	**Client ID:** BKT00301 **Laboratory ID:** RB592023 **Collection Date:** 5/21/96 **Type:** Trip Blank		
	Acetone	3 ug/L	None
WF018	**Client ID:** 30T00101 **Laboratory ID:** RB602011 **Collection Date:** 5/23/96 **Type:** Trip Blank		
	Methylene chloride	3 ug/L	None
	Acetone	10 ug/L	None
WF018	**Client ID:** 30R00101 **Laboratory ID:** RB602010 **Collection Date:** 5/23/96 **Type:** Rinsate		
	Acetone	6 ug/L	None
	Di-n-butylphthalate	9 ug/L	None
WF019	**Client ID:** 30T00201 **Laboratory ID:** MB047011 **Collection Date:** 6/4/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF019	**Client ID:** 30T00301 **Laboratory ID:** MB068002 **Collection Date:** 6/5/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF019	**Client ID:** 30R00201 **Laboratory ID:** MB047010 **Collection Date:** 6/4/96 **Type:** Rinsate		
	Volatiles	ND	None
	Di-n-butylphthalate	3 ug/L	None
	Bis(2-ethylhexyl)phthalate	4 ug/L	10U ug/L[1]

Table IX
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF019	**Client ID:** 30R00301 **Laboratory ID:** MB068001 **Collection Date:** 6/5/96 **Type:** Rinsate		
	Methylene chloride	3 ug/L	None
	Di-n-butylphthalate	7 ug/L	None
	Bis(2-ethylhexyl)phthalate	4 ug./L	None
WF019	**Client ID:** 30F00101 **Laboratory ID:** MB068003 **Collection Date:** 6/5/96 **Type:** Source Blank		
	Acetone	29 ug/L	None
	Di-n-butylphthalate	13 ug/L	None
WF020	**Client ID:** 33T00101 **Laboratory ID:** MB080017 **Collection Date:** 6/6/96 **Type:** Trip Blank		
	Volatiles	ND	None
WF020	**Client ID:** 33R00101 **Laboratory ID:** MB080016 **Collection Date:** 6/6/96 **Type:** Rinsate		
	Acetone	15 ug/L	None
	Di-n-butylphthalate	13 ug/L	None
	Bis(2-ethylhexyl)phthalate	3 ug/L	10U ug/L[1]

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes								
			Criteria		% Recovery			
SDG	Client ID	Analyte	% Recovery	RPD	MS	MSD	RPD	Qualifier
WF016	BKB00401	All metals Cyanide	- -	- -	- -	- -	- -	None None
WF016	BKR00201	Metals	-	-	-	-	-	None
WF016	BKF00101	Cyanide	-	-	-	-	-	None
WF017	31B00601	Lead Cyanide	75-125 -	≤35 -	179.2 -	- -	49.3 -	J None
WF018	30B00202	Lead	-	-	-	-	-	None
WF019	30B00502	Lead	-	-	-	-	-	None
WF019	30F00101	Lead	-	-	-	-	-	None
WF019	30B00601	Lead	75-125	-	66.4	-	-	J
WF020	33B00302	Lead	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF016	**Client ID**	**BKB00401**	**BKB00401D**	
	Laboratory ID	**RB583003**	**RB583004**	
	Collection Date	**5/20/96**	**5/20/96**	
	Aluminum	3600 mg/Kg	2290 mg/Kg	44
	Arsenic	0.54 mg/Kg	0.79 mg/Kg	38
	Barium	7.2 mg/Kg	6.4 mg/Kg	12
	Beryllium	ND	0.07 mg/Kg	Not calculable
	Calcium	194 mg/Kg	203 mg/Kg	5
	Chromium	3.2 mg/Kg	2.4 mg/Kg	29
	Cobalt	0.77 mg/Kg	0.58 mg/Kg	28
	Copper	1.8 mg/Kg	1.7 mg/Kg	6
	Iron	2220 mg/Kg	1660 mg/Kg	29
	Lead	1.4 mg/Kg	2.4 mg/Kg	53
	Magnesium	114 mg/Kg	93.0 mg/Kg	20
	Manganese	19.5 mg/Kg	14.5 mg/Kg	29
	Nickel	1.5 mg/Kg	ND	Not calculable
	Potassium	84.5 mg/Kg	ND	Not calculable
	Sodium	27.6 mg/Kg	22.5 mg/Kg	20
	Vavadium	4.9 mg/Kg	3.4 mg/Kg	36
	Zinc	3.9 mg/Kg	2.7 mg/Kg	36
	Cyanide	0.10 mg/Kg	0.13 mg/Kg	26
WF016	**Client ID**	**BKB00602**	**BKB00602D**	
	Laboratory ID	**RB583016**	**RB583017**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	5040 mg/Kg	6050 mg/Kg	18
	Arsenic	1.4 mg/Kg	0.95 mg/Kg	38
	Barium	5.2 mg/Kg	5.9 mg/Kg	13
	Calcium	210 mg/Kg	195 mg/Kg	7
	Chromium	4.5 mg/Kg	4.7 mg/Kg	4
	Copper	2.0 mg/Kg	2.3 mg/Kg	14
	Iron	3430 mg/Kg	3820 mg/Kg	11
	Lead	1.8 mg/Kg	1.7 mg/Kg	6
	Magnesium	97.6 mg/Kg	111 mg/Kg	13
	Manganese	9.5 mg/Kg	11.1 mg/Kg	16
	Nickel	1.6 mg/Kg	ND	Not calculable
	Sodium	28.6 mg/Kg	26.2 mg/Kg	9
	Vanadium	10.3 mg/Kg	11.3 mg/Kg	9
	Zinc	3.2 mg/Kg	3.1 mg/Kg	3
	Cyanide	0.13 mg/Kg	0.16 mg/Kg	21

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF017	**Client ID**	**31B00601**	**31B00601D**	
	Laboratory ID	**RB295001**	**RB592006**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	1580 mg/Kg	1760 mg/Kg	11
	Arsenic	0.44 mg/Kg	0.29 mg/Kg	41
	Barium	7.4 mg/Kg	9.6 mg/Kg	26
	Beryllium	0.07 mg/Kg	0.07 mg/Kg	0
	Cadmium	0.52 mg/Kg	0.68 mg/Kg	27
	Calcium	237 mg/Kg	297 mg/Kg	22
	Chromium	3.9 mg/Kg	5.4 mg/Kg	32
	Copper	11.4 mg/Kg	13.6 mg/Kg	18
	Iron	1120 mg/Kg	1310 mg/Kg	16
	Lead	6.3 mg/Kg	7.0 mg/Kg	11
	Magnesium	83.5 mg/Kg	98.7 mg/Kg	17
	Manganese	9.2 mg/Kg	11.3 mg/Kg	20
	Mercury	0.07 mg/Kg	0.08 mg/Kg	13
	Selenium	0.14 mg/Kg	ND mg/Kg	Not calculable
	Silver	1.1 mg/Kg	1.7 mg/Kg	43
	Sodium	23.5 mg/Kg	26.3 mg/Kg	11
	Vanadium	2.2 mg/Kg	2.4 mg/Kg	9
	Zinc	11.0 mg/Kg	15.9 mg/Kg	36
	Cyanide	0.10 mg/Kg	ND	Not calculable
WF017	**Client ID**	**12B00101**	**12B00101D**	
	Laboratory ID	**RB592007**	**RB592008**	
	Collection Date	**5/21/96**	**5/21/96**	
	Aluminum	25400 mg/Kg	8890 mg/Kg	96
	Arsenic	5.3 mg/Kg	1.2 mg/Kg	126
	Barium	18.0 mg/Kg	14.5 mg/Kg	22
	Beryllium	0.20 mg/Kg	ND	Not calculable
	Cadmium	0.57 mg/Kg	ND	Not calculable
	Calcium	495 mg/Kg	552 mg/Kg	11
	Chromium	19.9 mg/Kg	9.1 mg/Kg	74
	Copper	6.3 mg/Kg	2.9 mg/Kg	74
	Iron	16100 mg/Kg	8620 mg/Kg	61
	Lead	4.7 mg/Kg	3.4 mg/Kg	32
	Magnesium	170 mg/Kg	96.7 mg/Kg	55
	Manganese	7.7 mg/Kg	4.9 mg/Kg	44
	Mercury	0.04 mg/Kg	0.04 mg/Kg	0
	Nickel	2.5 mg/Kg	ND	Not calculable
	Potassium	81.2 mg/Kg	ND	Not calculable
	Sodium -	49.8 mg/Kg	33.4 mg/Kg	39
	Vanadium	41.7 mg/Kg	26.5 mg/Kg	45
	Zinc	3.6 mg/Kg	3.7 mg/Kg	3
	Cyanide	ND	ND	None
WF018	**Client ID**	**30B00202**	**30B00202D**	
	Laboratory ID	**RB602002**	**RB602005**	
	Collection Date	**5/23/96**	**5/23/96**	
	Lead	1.8 mg/Kg	1.9 mg/Kg	5
WF019	**Client ID**	**30B00502**	**30B00502D**	
	Laboratory ID	**MB047002**	**MB047005**	
	Collection Date	**6/4/96**	**6/4/96**	
	Lead	4.3 mg/Kg	3.9 mg/Kg	10
WF019	**Client ID**	**30B00602**	**30B00602D**	
	Laboratory ID	**MB068005**	**MB068009**	
	Collection Date	**6/5/96**	**6/5/96**	
	Lead	4.5 mg/Kg	5.0 mg/Kg	11

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF020	**Client ID** **Laboratory ID** **Collection Date**	**33B00302** **MB080002** **6/6/96**	**33B00302D** **MB080007** **6/6/96**	
	Lead	7.8 mg/Kg	7.1 mg/Kg	9
WF020	**Client ID** **Laboratory ID** **Collection Date**	**33B00102** **MB080013** **6/6/96**	**33B00102D** **MB080015** **6/6/96**	
	Lead	7.2 mg/Kg	8.0 mg/Kg	11

Table XII
Summary of Analytes Exceeding Instrument Calibration
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Criteria		Qualifier
			Initial Calibration r	Continuing Calibration %R	
WF016	All	All metals Cyanide	- -	- -	None None
WF017	All	All metals Cyanide	- -	- -	None None
WF018	All	Lead	-	-	None
WF019	All	Lead	-	-	None
WF020	All	Lead	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF016	Barium Iron Sodium Zinc	1.760 ug/L 31.120 ug/L 88.880 ug/L 16.920 ug/L	All water samples in SDG WF016
	Aluminum Calcium Copper Iron Sodium Thallium Zinc	3.309 mg/Kg 11.435 mg/Kg 0.249 mg/Kg 1.650 mg/Kg 5.214 mg/Kg 0.001 mg/Kg 1.342 mg/Kg	All soil samples in SDG WF016
	Cyanide	ND	All samples in SDG WF016
WF017	Barium Iron Sodium Zinc	1.760 ug/L 31.120 ug/L 88.880 ug/L 16.920 ug/L	All water samples in SDG WF017
	Aluminum Calcium Cobalt Copper Sodium Zinc	3.309 mg/Kg 11.435 mg/Kg 0.249 mg/Kg 1.650 mg/Kg 5.214 mg/Kg 1.342 mg/Kg	All soil samples in SDG WF017
	Cyanide	ND	All samples in SDG WF017
WF018	Lead	ND	All samples in SDG WF018
WF019	Lead	2.260 ug/L	All water samples in SDG WF019
WF020	Lead	ND	All samples in SDG WF020

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF016	**Client ID:**	**BKR00201**		
	Laboratory ID:	**RB583008**		
	Collection Date:	**5/20/96**		
	Type:	**Rinsate**		
	Barium		1.8 ug/L	1.7U ug/L[1]
	Iron		5.6 ug/L	5.6U ug/L[1]
	Lead		2.3 ug/L	None
	Sodium		57.5 ug/L	57.5U ug/L[1]
	Zinc		3.0 ug/L	3.0U ug/L[1]
	Cyanide		1.8 ug/L	None
WF016	**Client ID:**	**BKF00101**		
	Laboratory ID:	**RB583009**		
	Collection Date:	**5/20/96**		
	Type:	**Source Blank**		
	Iron		6.4 ug/L	6.4U ug/L[1]
	Sodium		52.9 ug/L	52.9U ug/L[1]
	Zinc		3.8 ug/L	3.8U ug/L[1]
	Cyanide		ND	None
WF017	**Client ID:**	**31R00101**		
	Laboratory ID:	**RB592020**		
	Collection Date:	**5/22/96**		
	Type:	**Rinsate**		
	Aluminum		86.5 ug/L	None
	Barium		2.3 ug/L	2.3U ug/L[1]
	Calcium		503 ug/L	None
	Chromium		11.3 ug/L	None
	Copper		1.4 ug/L	None
	Iron		132 ug/L	132U ug/L[1]
	Lead		0.60 ug/L	None
	Magnesium		66.2 ug/L	None
	Manganese		3.8 ug/L	None
	Sodium		264 ug/L	None
	Zinc		7.8 ug/L	7.8U ug/L[1]
	Cyanide		ND	None
WF017	**Client ID:**	**12R00101**		
	Laboratory ID:	**RB592022**		
	Collection Date:	**5/21/96**		
	Type:	**Rinsate**		
	Aluminum		19.1 ug/L	None
	Barium		1.8 ug/L	1.8U ug/L[1]
	Calcium		86.5 ug/L	None
	Iron		15.6 ug/L	15.6U ug/L[1]
	Lead		0.60 ug/L	None
	Magnesium		30.5 ug/L	None
	Sodium		59.8 ug/L	None
	Zinc		3.8 ug/L	3.8U ug/L[1]
	Cyanide		ND	None

Table XIV
Summary of Field Blank Contamination
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF018	Client ID:	30R00101		
	Laboratory ID:	RB602010		
	Collection Date:	5/23/96		
	Type:	Rinsate		
	Lead		ND	None
WF019	Client ID:	30R00201		
	Laboratory ID:	MB047010		
	Collection Date:	6/4/96		
	Type:	Rinsate		
	Lead		ND	None
WF019	Client ID:	30R00301		
	Laboratory ID:	MB068001		
	Collection Date:	6/5/96		
	Type:	Rinsate		
	Lead		ND	None
WF019	Client ID:	30F00101		
	Laboratory ID:	MB068003		
	Collection Date:	6/5/96		
	Type:	Source Blank		
	Lead		2.1 ug/L	2.1U ug/L[1]
WF020	Client ID:	33R00101		
	Laboratory ID:	MB080016		
	Collection Date:	6/6/96		
	Type:	Rinsate		
	Lead		1.6 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table XV
Sample Event PARCC Summary
Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF016	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF017	Volatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF018	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF019	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100[3]	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable
WF020	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Lead	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida
PARCC Summary Tables

Draft Version

12/12/97

APPENDIX A

Table of Contents

Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

Table 1

SDG#: WF022	VALIDATION SAMPLE TABLE	LDC#: 1932A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
BKT01001	RB858001	TB	water	7-16-96	X				
BKR01001	RB858002	R	water	7-16-96	X	X	X	X	X
BKG00101	RB858003		water	7-16-96	X	X	X	X	X
BKG00101D	RB858004	FD	water	7-16-96	X	X	X	X	X
BKG00102	RB858005		water	7-16-96	X	X	X	X	X
BKG00102F	RB858006		water	7-16-96				X	
BKG00103	RB858007		water	7-16-96	X	X	X	X	X
BKG00202	RB858008		water	7-17-96	X	X	X	X	X
BKG00201	RB858009		water	7-17-96	X	X	X	X	X
BKF01001	RB858010	SB	water	7-17-96	X	X	X	X	X
17T01101	RB873001	TB	water	7-18-96	X				
17G00102	RB873002		water	7-18-96	X	X	X	X	X
17G00101	RB873003		water	7-18-96	X	X	X	X	X
17G00201	RB873004		water	7-18-96	X	X	X	X	X
17G00301	RB873005		water	7-18-96	X	X	X	X	X
17G00201F	RB873006		water	7-18-96				X	
01G00101	RB873007		water	7-19-96	X	X	X	X	X
01G00102	RB873008		water	7-19-96	X	X	X	X	X
01G00102D	RB873009		water	7-19-96	X	X	X	X	X
BKG00101MS	RB858003MS	MS	water	7-16-96	X	X	X	X	X
BKG00101MSD	RB858003MSD	MSD	water	7-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF023	VALIDATION SAMPLE TABLE	LDC#: 1942A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
01T01201	RB887001	TB	water	7-22-96	X				
01G00401	RB887002		water	7-22-96	X	X	X	X	X
01G00201	RB887003		water	7-22-96	X	X	X	X	X
01G00201F	RB887004		water	7-22-96				X	
01R01101	RB887005	R	water	7-23-96	X	X	X	X	X
01G00301	RB887006		water	7-23-96	X	X	X	X	X
BKG00301	RB887007		water	7-23-96	X	X	X	X	X
02G00201	RB887008		water	7-23-96	X	X	X	X	X
02G00101	RB887009		water	7-23-96	X	X	X	X	X
02G00101F	RB887010		water	7-23-96				X	
18G00301	RB887011		water	7-24-96	X	X	X	X	X
02G00301	RB887012		water	7-24-96	X	X	X	X	X
02G00301D	RB887013	FD	water	7-24-96	X	X	X	X	X
16T01301	RB887014		water	7-25-96	X				
16G00701	RB887015		water	7-25-96	X	X	X	X	X
16G00702	RB887016		water	7-25-96	X	X	X	X	X
16G00702DL	RB887016DL		water	7-25-96	X				
16G00703	RB887017		water	7-25-96	X	X	X	X	X
16G00703DL	RB887017DL		water	7-25-96	X				
18G00201	RB887018		water	7-26-96	X	X	X	X	X
02G00301MS	RB887012MS	MS	water	7-24-96	X	X	X	X	X
02G00301MSD	RB887012MSD	MSD	water	7-24-96	X	X	X	X	X

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF024	VALIDATION SAMPLE TABLE	LDC#: 1943A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
18T01401	RB920001	TB	water	7-29-96	X				
18G00101	RB920002		water	7-29-96	X	X	X	X	X
15G00401	RB920003		water	7-30-96	X	X	X	X	X
BKG00203	RB920004		water	7-30-96	X	X	X	X	X
15R01201	RB920005	R	water	7-31-96	X	X	X	X	X
BKG00203F	RB920006		water	7-30-96				X	
15G00702	RB920007		water	7-31-96	X	X	X	X	X
15G00702F	RB920008		water	7-31-96				X	
15G00701	RB920009		water	7-31-96	X	X	X	X	X
15G00701D	RB920010	FD	water	7-31-96	X	X	X	X	X
15G00701MS	RB920009MS	MS	water	7-31-96	X	X	X	X	X
15G00701MSD	RB920009MSD	MSD	water	7-31-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1									
SDG#: WF025				**VALIDATION SAMPLE TABLE**					**LDC#:** 1956A
Project Name: NAS Whiting Field				Parameters/Analytical Method					**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
15T01501	RB956001	TB	water	8-5-96	X				
15G00703	RB956002		water	8-5-96	X	X	X	X	X
15G00503	RB956003		water	8-6-96	X	X	X	X	X
15G00503DL	RB956003DL		water	8-6-96	X				
15G00502	RB956004		water	8-6-96	X	X	X	X	X
15G00501	RB956005		water	8-6-96	X	X	X	X	X
15G00601	RB956006		water	8-7-96	X	X	X	X	X
15G00603	RB956007		water	8-7-96	X	X	X	X	X
15G00601D	RB956008	FD	water	8-7-96	X	X	X	X	X
15G00503F	RB956009		water	8-6-96				X	
15G00501F	RB956010		water	8-6-96				X	
15R01301	RB956011	R	water	8-7-96	X	X	X	X	X
15T01601	RB956012	TB	water	8-8-96	X				
15G00301	RB956013		water	8-8-96	X	X	X	X	X
15G00302	RB956014		water	8-8-96	X	X	X	X	X
15G00303	RB956015		water	8-9-96	X	X	X	X	X
15G00101	RB956016		water	8-8-96	X	X	X	X	X
15G00203	RB956017		water	8-9-96	X	X	X	X	X
15G00301F	RB956018		water	8-8-96				X	
15G00203F	RB956019		water	8-9-96				X	
15G00601MS	RB956006MS	MS	water	8-7-96	X	X	X	X	X
15G00601MSD	RB956006MSD	MSD	water	8-7-96	X	X	X	X	X

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF026	VALIDATION SAMPLE TABLE	LDC#: 1957A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
15T01701	RB980001	TB	water	8-12-96	X				
15G00202	RB980002		water	8-12-96	X	X	X	X	X
15G00201	RB980003		water	8-13-96	X	X	X	X	X
15G00802	RB980004		water	8-13-96	X	X	X	X	X
15G00802R	RB980004R		water	8-13-96		X			
15G00801	RB980005		water	8-13-96	X	X	X	X	X
16G00201	RB980006		water	8-14-96	X	X	X	X	X
15G00803	RB980007		water	8-14-96	X	X	X	X	X
16G00803D	RB980008	FD	water	8-14-96	X	X	X	X	X
15G00202F	RB980009		water	8-12-96				X	
15G00201F	RB980010		water	8-13-96				X	
15G00802F	RB980011		water	8-13-96				X	
15R01401	RB980012	R	water	8-14-96	X	X	X	X	X
15G00803F	RB980013		water	8-14-96				X	
16G00201F	RB980014		water	8-14-96				X	
16T01801	RB980015	TB	water	8-15-96	X				
16G00202	RB980016		water	8-15-96	X	X	X	X	X
16G00202DL	RB980016DL		water	8-15-96	X				
16G00203	RB980017		water	8-15-96	X	X	X	X	X
16G00602	RB980018		water	8-15-96	X	X	X	X	X
16G00601	RB980019		water	8-16-96	X	X	X	X	X
16G00403	RB980020		water	8-16-96	X	X	X	X	X
16G00403DL	RB980020DL		water	8-16-96	X				
16G00403D	RB980021		water	8-16-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF026 | **VALIDATION SAMPLE TABLE** | **LDC#:** 1957A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
16G00403DDL	RB980021DL		water	8-16-96	X				
16G00601F	RB980022		water	8-16-96				X	
16G00403F	RB980023		'water	8-16-96				X	
15G00803MS	RB980007MS	MS	water	8-14-96	X	X	X	X	X
15G00803MSD	RB980007MSD	MSD	water	8-14-96	X	X	X	X	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Mat ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF025					VALIDATION SAMPLE TABLE	LDC#: 1970A
Project Name: NAS Whiting Field					Parameters/Analytical Method	**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**Pesticides/PCBs**	
15G00502RE	RB956004RE		water	8-6-96	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF027 **VALIDATION SAMPLE TABLE** **LDC#:** 1970B

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
16T01901	RC016001	TB	water	8-19-96	X				
16G00401	RC016002		water	8-19-96	X	X	X	X	X
16G00402	RC016003		water	8-19-96	X	X	X	X	X
16G00101	RC016004		water	8-19-96	X	X	X	X	X
16G00301	RC016005		water	8-20-96	X	X	X	X	X
16G00302	RC016006		water	8-20-96	X	X	X	X	X
16G00304	RC016007		water	8-20-96	X	X	X	X	X
16G00303	RC016008		water	8-21-96	X	X	X	X	X
16G00501	RC016009		water	8-21-96	X	X	X	X	X
16G00303F	RC016010		water	8-21-96				X	
16G00501F	RC016011		water	8-21-96				X	
16R01501	RC016012	R	water	8-21-96	X	X	X	X	X
16G00501D	RC016013	FD	water	8-21-96	X	X	X	X	X
66T02001	RC016014	TB	water	8-22-96	X				
66G02101	RC016015		water	8-22-96	X	X	X	X	X
66G02103	RC016016		water	8-22-96	X	X	X	X	X
66G02102	RC016017		water	8-22-96	X	X	X	X	X
09G00101	RC016018		water	8-23-96	X	X	X	X	X
09G00301	RC016019		water	8-23-96	X	X	X	X	X
09G00301D	RC016020	FD	water	8-23-96	X	X	X	X	X
66G02102F	RC016021		water	8-23-96				X	
09G00301F	RC016022		water	8-23-96				X	
16G00501MS	RC016009MS	MS	water	8-21-96	X	X	X	X	X
16G00501MSD	RC016009MSD	MSD	water	8-21-96	X	X	X	X	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Mat [illegible] ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF028					VALIDATION SAMPLE TABLE				LDC#: 1974A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
10T02101	RC044001	TB	water	8-26-96	X				
09G00201	RC044002		water	8-26-96	X	X	X	X	X
10G00101	RC044003		water	8-26-96	X	X	X	X	X
10G00201	RC044004		water	8-26-96	X	X	X	X	X
11G00402	RC044005		water	8-26-96	X	X	X	X	X
11G00102	RC044006		water	8-27-96	X	X	X	X	X
11G00401	RC044007		water	8-27-96	X	X	X	X	X
11T02201	RC044008	TB	water	8-28-96	X				
11G00301	RC044009		water	8-28-96	X	X	X	X	X
11G00101	RC044010		water	8-28-96	X	X	X	X	X
11G00201	RC044011		water	8-28-96	X	X	X	X	X
12G00101	RC044012		water	8-27-96	X	X	X	X	X
12G00201	RC044013		water	8-27-96	X	X	X	X	X
11G00201F	RC044014		water	8-28-96				X	
11G00301F	RC044015		water	8-28-96				X	
11R01601	RC044016		water	8-28-96	X	X	X	X	X
12G00101D	RC044017	FD	water	8-27-96	X	X	X	X	X
11G00201D	RC044018	FD	water	8-28-96	X	X	X	X	X
12G00101MS	RC044012MS	MS	water	8-27-96	X	X	X	X	X
12G00101MSD	RC044012MSD	MSD	water	8-27-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1									
SDG#: WF029				VALIDATION SAMPLE TABLE					**LDC#:** 1989A
Project Name: NAS Whiting Field				Parameters/Analytical Method					**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA**	**SVOA**	**Pesticides /PCBs**	**Metals**	**Cyanide**
13T02301	RC092001	TB	water	9-9-96	X				
13G00101	RC092002		water	9-9-96	X	X	X	X	X
13G00102	RC092003		'water	9-9-96	X	X	X	X	X
13G00201	RC092004		water	9-10-96	X	X	X	X	X
13G00103	RC092005		water	9-10-96	X	X	X	X	X
14G00201	RC092006		water	9-10-96	X	X	X	X	X
14G00101	RC092007		water	9-11-96	X	X	X	X	X
13R01701	RC092008	R	water	9-11-96	X	X	X	X	X
14G00101D	RC092009	FD	water	9-11-96	X	X	X	X	X
13G00103F	RC092010		water	9-10-96				X	
66T02401	RC092011	TB	water	9-12-96	X				
66G00901	RC092012		water	9-12-96	X	X	X	X	X
66G00904	RC092013		water	9-12-96	X	X	X	X	X
66G00902	RC092014		water	9-13-96	X	X	X	X	X
66G00903	RC092015		water	9-13-96	X	X	X	X	X
66G00903F	RC092016		water	9-13-96				X	
14G00101MS	RC092007MS	MS	water	9-11-96	X	X	X	X	X
14G00101MSD	RC092007MSD	MSD	water	9-11-96	X	X	X	X	X

T' Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matri· ·pike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF030 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2000A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
66T02501	RC121001	TB	water	9-16-96	X				
66G00801	RC121002		water	9-16-96	X	X	X	X	X
66G00802	RC121003		water	9-16-96	X	X	X	X	X
66G00803	RC121004		water	9-17-96	X	X	X	X	X
66G00804	RC121005		water	9-17-96	X	X	X	X	X
66G00602	RC121006		water	9-17-96	X	X	X	X	X
66G00601	RC121007		water	9-18-96	X	X	X	X	X
66G00603	RC121008		water	9-18-96	X	X	X	X	X
66G00804F	RC121009		water	9-17-96				X	
66R01801	RC121010		water	9-18-96	X	X	X	X	X
66G00601D	RC121011	FD	water	9-18-96	X	X	X	X	X
66T02601	RC121012	TB	water	9-19-96	X				
66G00604	RC121013		water	9-19-96	X	X	X	X	X
66G02201	RC121014		water	9-19-96	X	X	X	X	X
66G02202	RC121015		water	9-19-96	X	X	X	X	X
66G02203	RC121016		water	9-20-96	X	X	X	X	X
66G02203D	RC121017	FD	water	9-20-96	X	X	X	X	X
66G00601MS	RC121007MS	MS	water	9-18-96	X	X	X	X	X
66G00601MSD	RC121007MSD	MSD	water	9-18-96	X	X	X	X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF031 **VALIDATION SAMPLE TABLE** **LDC#:** 2031A

Project Name: NAS Whiting Field Parameters/Analytical Method **Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA	SVOA	Pesticides /PCBs	Metals	Cyanide
05T02701	MB928001	TB	water	9-23-96	X				
05G00801	MB928002		water	9-23-96	X	X	X	X	X
05G00802	MB928003		water	9-23-96	X	X	X	X	X
05G00901	MB928004		water	9-24-96	X	X	X	X	X
05G00902	MB928005		water	9-24-96	X	X	X	X	X
05G01002	MB928006		water	9-24-96	X	X	X	X	X
05G01001	MB928007		water	9-25-96	X	X	X	X	X
05G00301	MB928008		water	9-25-96	X	X	X	X	X
05G00301RE	MB928008RE		water	9-25-96		X			
05G00801F	MB928009		water	9-23-96				X	
05G00902F	MB928010		water	9-24-96				X	
05R01901	MB928011	R	water	9-25-96	X	X	X	X	X
05G01001D	MB928012	FD	water	9-25-96	X	X	X	X	X
33T02801	MB958001	TB	water	9-26-96	X				
05G00101	MB958002		water	9-26-96	X	X	X	X	X
33G00501	MB958003		water	9-26-96	X	X	X	X	X
33G00201	MB958004		water	9-26-96	X	X	X	X	X
33G00101	MB958005		water	9-27-96	X	X	X	X	X
33G00301	MB958006		water	9-27-96	X	X	X	X	X
33G00301D	MB958007	FD	water	9-27-96	X	X	X	X	X
05G01001MS	MB928007MS	MS	water	9-25-96	X	X	X	X	X
05G01001MSD	MB928007MSD	MSD	water	9-25-96	X	X	X		
05G01001DUP	MB928007DUP	DUP	water	9-25-96				X	X

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matr Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF031B					VALIDATION SAMPLE TABLE				LDC#: 2121A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 7560-32
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals (CLP-2.1)**	**Cyanide**
05G01002	MC447001		water	11-21-96	X	X	X	X	X
16T04001	MC447002	TB	water	11-21-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF032					VALIDATION SAMPLE TABLE				LDC#: 2046A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
06T02901	MC011001	TB	water	9-30-96	X				
33G00401	MC011002		water	9-30-96	X	X	X	X	X
06G00102	MC011003		water	10-1-96	X	X	X	X	X
06G00101	MC011004		water	10-1-96	X	X	X	X	X
06G00301	MC011005		water	10-2-96	X	X	X	X	X
06R02001	MC011006	R	water	10-2-96	X	X	X	X	X
29G00501	MC011007		water	10-2-96	X	X	X	X	X
29G00501D	MC011008	FD	water	10-2-96	X	X	X	X	X
29T03001	MC037001	TB	water	10-3-96	X				
29G00101	MC037002		water	10-3-96	X	X	X	X	X
66G01201	MC037003		water	10-3-96	X	X	X	X	X
66G00102	MC037004		water	10-4-96	X	X	X	X	X
29G00501MS	MC011007MS	MS	water	10-2-96	X	X	X	X	X
29G00501MSD	MC011007MSD	MSD	water	10-2-96	X	X	X		
29G00501DUP	MC011007DUP	DUP	water	10-2-96				X	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF033	VALIDATION SAMPLE TABLE	LDC#: 2069A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 8532-20

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)	SVOA (CLP-1.9)	Pesticides /PCBs (CLP-1.9)	Metals	Cyanide
29T03101	MC085001	TB	water	10-7-96	X				
26G00401	MC085002		water	10-7-96	X	X	X	X	X
26G00301	MC085003		water	10-8-96	X	X	X	X	X
66G00202	MC085004		water	10-8-96	X	X	X	X	X
29G00201	MC085005		water	10-8-96	X	X	X	X	X
66G01901	MC085006		water	10-9-96	X	X	X	X	X
66R02101	MC085007	R	water	10-9-96	X	X	X	X	X
66T03201	MC118001	TB	water	10-10-96	X				
66G00201	MC118002		water	10-9-96	X	X	X	X	X
66G00201D	MC118003	FD	water	10-9-96	X	X	X	X	X
07G00101	MC118004		water	10-10-96	X	X	X	X	X
30G00501	MC118005		water	10-10-96	X	X	X	X	X
66G00301	MC118006		water	10-11-96	X	X	X	X	X
66G00201MS	MC118002MS	MS	water	10-9-96	X	X	X	X	X
66G00201MSD	MC118002MSD	MSD	water	10-9-96	X	X	X		
66G00201DUP	MC118002DUP	DUP	water	10-9-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1									
SDG#: WF034				**VALIDATION SAMPLE TABLE**					**LDC#:** 2070A
Project Name: NAS Whiting Field				Parameters/Analytical Method					**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
66T03301	MC153001	TB	water	10-14-96	X				
66G02001	MC153002		water	10-14-96	X	X	X	X	X
66G00302	MC153003		'water	10-15-96	X	X	X	X	X
66G01801	MC153004		water	10-16-96	X	X	X	X	X
30G00301	MC153005		water	10-16-96	X	X	X	X	X
30G00401	MC153006		water	10-16-96	X	X	X	X	X
66R02201	MC153007	R	water	10-16-96	X	X	X	X	X
30G00301D	MC153008	FD	water	10-16-96	X	X	X	X	X
66T03401	MC176001	TB	water	10-17-96	X				
66G01101	MC176002		water	10-17-96	X	X	X	X	X
66G01301	MC176003		water	10-17-96	X	X	X	X	X
66G00501	MC176004		water	10-18-96	X	X	X	X	X
66G00501F	MC176005		water	10-18-96				X	
30G00301MS	MC153005MS	MS	water	10-16-96	X	X	X	X	X
30G00301MSD	MC153005MSD	MSD	water	10-16-96	X	X	X		
30G00301DUP	MC153005DUP	DUP	water	10-16-96				X	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matri Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF035					VALIDATION SAMPLE TABLE				LDC#: 2076A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
66T03501	MC214001	TB	water	10-21-96	X				
66G00401	MC214002		water	10-21-96	X	X	X	X	X
66G01601	MC214003		water	10-22-96	X	X	X	X	X
66G01501	MC214004		water	10-22-96	X	X	X	X	X
66G01701	MC214005		water	10-23-96	X	X	X	X	X
66R02301	MC214006	R	water	10-23-96	X	X	X	X	X
66G01701D	MC214007	FD	water	10-23-96	X	X	X	X	X
66T03601	MC231001	TB	water	10-24-96	X				
66G00101	MC231002		water	10-24-96	X	X	X	X	X
08G00101	MC231003		water	10-24-96	X	X	X	X	X
66G01001	MC231004		water	10-25-96	X	X	X	X	X
66G01701MS	MC214005MS	MS	water	10-23-96	X	X	X	X	X
66G01701MSD	MC214005MSD	MSD	water	10-23-96	X	X	X		
66G01701DUP	MC214005DUP	DUP	water	10-23-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF036					VALIDATION SAMPLE TABLE				LDC#: 2077A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
66T03701	MC262001	TB	water	10-28-96	X				
66G00701	MC262002		water	10-29-96	X	X	X	X	X
54G00201	MC262003		water	10-29-96	X	X	X	X	X
54G00101	MC262004		water	10-30-96	X	X	X	X	X
31G00201	MC262005		water	10-30-96	X	X	X	X	X
31G00201F	MC262006		water	10-30-96				X	
54R02401	MC262007	R	water	10-30-96	X	X	X	X	X
54G00101D	MC262008	FD	water	10-30-96	X	X	X	X	X
31T03801	MC284001	TB	water	10-31-96	X				
31G00301	MC284002		water	10-31-96	X	X	X	X	X
31G00402	MC284003		water	10-31-96	X	X	X	X	X
31G00403	MC284004		water	11-1-96	X	X	X	X	X
54G00101MS	MC262004MS	MS	water	10-30-96	X	X	X	X	X
54G00101MSD	MC262004MSD	MSD	water	10-30-96	X	X	X		
54G00101DUP	MC262004DUP	DUP	water	10-30-96				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF037					VALIDATION SAMPLE TABLE				LDC#: 2071A
Project Name: NAS Whiting Field					Parameters/Analytical Method				**Job#:** 8532-20
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (CLP-1.9)**	**SVOA (CLP-1.9)**	**Pesticides /PCBs (CLP-1.9)**	**Metals**	**Cyanide**
15T03901	MC424001	TB	water	11-18-96	X				
15G00502	MC424002		water	11-18-96	X				
15G00503	MC424003		water	11-18-96	X				
16G00202	MC424004		water	11-19-96	X				
16G00203	MC424005		water	11-19-96	X				
15G00802	MC424006		water	11-20-96	X				
15G00803	MC424007		water	11-20-96	X				
15G00803D	MC424008	FD	water	11-20-96	X				
15R02501	MC424009	R	water	11-20-96	X				
15F00201	MC424010		water	11-20-96	X	X	X	X	X
16G00702	MC448001		water	11-21-96	X				
16G00703	MC448002		water	11-21-96	X				
16G00403	MC448003		water	11-22-96	X				
16T04001	MC448004	TB	water	11-21-96	X				
15G00803MS	MC424007MS	MS	water	11-20-96	X				
15G00803MSD	MC424007MSD	MSD	water	11-20-96	X				

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF038	VALIDATION SAMPLE TABLE	LDC#: 2099A
Project Name: NAS Whiting Field	Parameters/Analytical Method	**Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
36T04101	MC687001	TB	water	12-17-96	X
36BO0101	MC687002		soil	12-17-96	X
36BO0102	MC687003		soil	12-17-96	X
36BO0103	MC687004		soil	12-17-96	X
36BO0201	MC687005		soil	12-17-96	X
36BO0202	MC687006		soil	12-17-96	X
36BO0203	MC687007		soil	12-17-96	X
36BO0301	MC687008		soil	12-17-96	X
36BO0302	MC687009		soil	12-17-96	X
36BO0303	MC687010		soil	12-17-96	X
36BO0303D	MC687011	FD	soil	12-17-96	X
36BO0401	MC687012		soil	12-18-96	X
36BO0401DL	MC687012DL		soil	12-18-96	X
36BO0402	MC687013		soil	12-18-96	X
36BO0403	MC687014		soil	12-18-96	X
36BO0403D	MC687015	FD	soil	12-18-96	X
36RO2601	MC687016	R	water	12-18-96	X
36BO0303MS	MC687011MS	MS	soil	12-17-96	X
36BO0303MSD	MC687011MSD	MSD	soil	12-17-96	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Mat ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF039 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2102A

Project Name: NAS Whiting Field | Parameters/Analytical Method | **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4201	MC698001	TB	water	12-19-96	X
35BO0101	MC698002		soil	12-20-96	X
35BO0102	MC698003		soil	12-20-96	X
35BO0102DL	MC698003DL		soil	12-20-96	X
35BO0103	MC698004		soil	12-20-96	X
35BO0104	MC698005		soil	12-20-96	X
35BO0105	MC698006		soil	12-20-96	X
35BO0106	MC698007		soil	12-21-96	X
35BO0201	MC698008		soil	12-21-96	X
35BO0202	MC698009		soil	12-21-96	X
35BO0203	MC698010		soil	12-21-96	X
35RO2701	MC698011	R	water	12-21-96	X
35BO0301	MC698012		soil	12-21-96	X
35BO0302	MC698013		soil	12-21-96	X
35BO0303	MC698014		soil	12-21-96	X
35BO0302D	MC698015	FD	soil	12-21-96	X
35BO0203D	MC698016	FD	soil	12-21-96	X
35BO0203MS	MC698010MS	MS	soil	12-21-96	X
35BO0203MSD	MC698010MSD	MSD	soil	12-21-96	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF040 — **VALIDATION SAMPLE TABLE** — **LDC#:** 2120A

Project Name: NAS Whiting Field — Parameters/Analytical Method — **Job#:** 7560-32

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (CLP-1.9)
35TO4301	MC783001	TB	water	1-7-97	X
35BO0401	MC783002		soil	1-7-97	X
35BO0402	MC783003		soil	1-7-97	X
35BO0403	MC783004		soil	1-7-97	X
35BO0501	MC783005		soil	1-7-97	X
35BO0501DL	MC783005DL		soil	1-7-97	X
35BO0502	MC783006		soil	1-7-97	X
35BO0503	MC783007		soil	1-7-97	X
35BO0201	MC783008		soil	1-8-97	X
35BO0202	MC783009		soil	1-8-97	X
35BO0203	MC783010		soil	1-8-97	X
35BO0101	MC783011		soil	1-8-97	X
35BO0102	MC783012		soil	1-8-97	X
35BO0103	MC783013		soil	1-8-97	X
35BO0301	MC783014		soil	1-9-97	X
35BO0302	MC783015		soil	1-9-97	X
35BO0303	MC783016		soil	1-9-97	X
35R02801	MC783017	R	water	1-9-97	X
35BO0203D	MC783018	FD	soil	1-8-97	X
35BO0103D	MC783019	FD	soil	1-8-97	X
35BO0203MS	MC783010MS	MS	soil	1-8-97	X
35BO0203MSD	MC783010MSD	MSD	soil	1-8-97	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matri[illegible]pike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF041 — VALIDATION SAMPLE TABLE — LDC#: 2323A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)	Pesticides /PCBs (1.9)	Metals (2.1)
35T04501	MD908001	TB	water	6-11-97	X			
35F00301	MD908002		water	6-11-97	X	X	X	X
35R03001	MD908003	R	water	6-11-97	X	X	X	X
35G00101	MD908004		water	6-11-97	X	X	X	X
35G00101D	MD908005	FD	water	6-11-97	X	X	X	X
35G00101DRE	MD908005RE	FD	water	6-11-97		X		
35G00103	MD908006		water	6-11-97	X	X	X	X
35G00103F	MD908007		water	6-11-97				X
35G00102	MD908008		water	6-12-97	X	X	X	X
37G00102	MD908009		water	6-12-97	X	X	X	X
37T04601	MD926001	TB	water	6-12-97	X			
36G00101	MD926002		water	6-12-97	X	X	X	X
36G00101F	MD926003		water	6-12-97				X
37G00101	MD926004		water	6-12-97	X	X	X	X
36G00102	MD926005		water	6-13-97	X	X	X	X
36G00102RE	MD926005RE		water	6-13-97		X		
36G00103	MD926006		water	6-13-97	X	X	X	X
36G00103RE	MD926006RE		water	6-13-97		X		
35T04701	MD950001	TB	water	6-15-97	X			
35G00202	MD950002		water	6-15-97	X	X	X	X
35G00202D	MD950003	FD	water	6-15-97	X	X	X	X
35G00203	MD950004		water	6-15-97	X	X	X	X
35G00201	MD950005		water	6-16-97	X	X	X	X
35G00201F	MD950006		water	6-16-97				X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF041					VALIDATION SAMPLE TABLE			LDC#: 2323A
Project Name: NAS Whiting					Parameters/Analytical Method			
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (2.1)**
13T04801	MD985001	TB	water	6-16-97	X			
13G00301	MD985002		water	6-16-97	X	X	X	X
13G00301F	MD985003		water	6-16-97				X
13G00401	MD985004		water	6-16-97	X	X	X	X
35G00101MS	MD908004MS	MS	water	6-11-97	X	X	X	X
35G00101MSD	MD908004MSD	MSD	water	6-11-97	X	X	X	
35G00101DUP	MD908004DUP	DUP	water	6-11-97				X

* Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF042		VALIDATION SAMPLE TABLE			LDC#: 2311A
Project Name: NAS Whiting					Parameters/Analytical Method
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
05T04901	ME007001	TB	water	6-18-97	X
05G00301	ME007002		water	6-17-97	X
05G00901	ME007003		water	6-18-97	X
05G00902	ME007004		water	6-19-97	X
05G00902D	ME007005	FD	water	6-19-97	X
05R03101	ME007006	R	water	6-17-97	X
05T05001	ME021001		water	6-20-97	X
05G01001	ME021002		water	6-20-97	X
05G01002	ME021003		water	6-20-97	X
05G00902MS	ME007004MS	MS	water	6-19-97	X
05G00902MSD	ME007004MSD	MSD	water	6-19-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF043 — **VALIDATION SAMPLE TABLE** — **LDC#:** 2315A

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
05T05101	ME042001	TB	water	6-23-97	X
05R03201	ME042002	R	water	6-23-97	X
05G00801	ME042003		water	6-24-97	X
05G00802	ME042004		water	6-24-97	X
05G00802D	ME042005	FD	water	6-24-97	X
33T05201	ME053001	TB	water	6-24-97	X
33G00501	ME053002		water	6-24-97	X
33G00101	ME053003		water	6-24-97	X
33G00201	ME053004		water	6-25-97	X
33G00301	ME053005		water	6-25-97	X
33G00301DL	ME053005DL		water	6-25-97	X
33T05301	ME073001	TB	water	6-25-97	X
06G00102	ME073002		water	6-26-97	X
06G00301	ME073003		water	6-26-97	X
33G00401	ME073004		water	6-26-97	X
30T05401	ME087001	TB	water	6-26-97	X
07G00101	ME087002		water	6-26-97	X
07G00101D	ME087003	FD	water	6-26-97	X
30G00501	ME087004		water	6-26-97	X
30G00301	ME087005		water	6-27-97	X
30G00401	ME087006		water	6-27-97	X
05G00802MS	ME042004MS	MS	water	6-24-97	X
05G00802MSD	ME042004MSD	MSD	water	6-24-97	X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Mat[illegible]ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF044		VALIDATION SAMPLE TABLE			LDC#: 2322A
Project Name: NAS Whiting					Parameters/Analytical Method
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
06T05501	ME100001	TB	water	6-29-97	X
06R03301	ME100002	R	water	6-29-97	X
66G00201	ME100003		water	6-29-97	X
06G00101	ME100004		water	6-29-97	X
66G00202	ME100005		water	6-30-97	X
66T05601	ME110001	TB	water	6-30-97	X
66G01201	ME110002		water	6-30-97	X
66G01201D	ME110003	FD	water	6-30-97	X
66G00102	ME110004		water	7-1-97	X
66G01301	ME110005		water	7-1-97	X
66T05701	ME133001	TB	water	7-2-97	X
66G00401	ME133002		water	7-2-97	X
66G02001	ME133003		water	7-2-97	X
66T05801	ME135001	TB	water	7-2-97	X
66G00603	ME135002		water	7-2-97	X
66G00603D	ME135003	FD	water	7-2-97	X
66G00604	ME135004		water	7-2-97	X
66G00601	ME135005		water	7-3-97	X
66G00602	ME135006		water	7-3-97	X
66G01201MS	ME110002MS	MS	water	6-30-97	X
66G01201MSD	ME110002MSD	MSD	water	6-30-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF045					VALIDATION SAMPLE TABLE				LDC#: 2345A
Project Name: NAS Whiting					Parameters/Analytical Method				
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (2.1)**	**Cyanide**
OWT05901	ME149001	TB	water	7-7-97	X				
OWR03401	ME149002	R	water	7-7-97	X	X	X	X	X
OWG00501	ME149003		water	7-8-97	X	X	X	X	X
OWG00502	ME149004		water	7-8-97	X	X	X	X	X
OWG00502D	ME149005	FD	water	7-8-97	X	X	X	X	X
OWG00503	ME149006		water	7-8-97	X	X	X	X	X
OWG00503F	ME149007		water	7-8-97				X	
OWT06001	ME159001	TB	water	7-8-97	X				
OWG00101	ME159002		water	7-9-97	X	X	X	X	X
OWG00101RE	ME159002RE		water	7-9-97		X			
OWG00102	ME159003		water	7-9-97	X	X	X	X	X
OWG00102RE	ME159003RE		water	7-9-97		X			
OWG00103	ME159004		water	7-9-97	X	X	X	X	X
OWG00103RE	ME159004RE		water	7-9-97		X			
66T06101	ME175001	TB	water	7-9-97	X				
66G02301	ME175002		water	7-9-97	X	X	X	X	X
66G02301RE	ME175002RE		water	7-9-97		X			
66G02302	ME175003		water	7-9-97	X	X	X	X	X
66G02303	ME175004		water	7-10-97	X	X	X	X	X
OWT06201	ME190001	TB	water	7-10-97	X				
OWG00302	ME190002		water	7-10-97	X	X	X	X	X
OWG00302D	ME190003	FD	water	7-10-97	X	X	X	X	X
OWG00303	ME190004		water	7-10-97	X	X	X	X	X
OWG00301	ME190005		water	7-11-97	X	X	X	X	X

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF045				VALIDATION SAMPLE TABLE					LDC#: 2345A
Project Name: NAS Whiting				Parameters/Analytical Method					
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (2.1)**	**Cyanide**
OWG00301F	ME190006		water	7-11-97				X	
OWT06401	ME226001	TB	water	7-14-97	X				
OWT06401DL	ME226001DL		water	7-14-97	X				
OWG00401	ME226002		water	7-14-97	X	X	X	X	X
OWG00201	ME226003		water	7-15-97	X	X	X	X	X
OWG00502MS	ME149004MS	MS	water	7-8-97	X	X	X	X	X
OWG00502MSD	ME149004MSD	MSD	water	7-8-97	X	X	X		
OWG00502DUP	ME149004DUP	DUP	water	7-8-97				X	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF046					VALIDATION SAMPLE TABLE				LDC#: 2377A
Project Name: NAS Whiting					Parameters/Analytical Method				
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**SVOA (1.9)**	**Pesticides /PCBs (1.9)**	**Metals (4.0)**	**Cyanide**
OWT06501	ME241001	TB	water	7-15-97	X				
31R03301	ME241002	R	water	7-15-97	X	X	X	X	X
31G00101	ME241003		water	7-15-97	X	X	X	X	X
31G00101D	ME241004	FD	water	7-15-97	X	X	X	X	X
OWT06601	ME261001	TB	water	7-16-97	X				
31G00401	ME261002		water	7-16-97	X	X	X	X	X
31G00402	ME261003		water	7-16-97	X				
31G00403	ME261004		water	7-16-97	X				
31G00301	ME261005		water	7-16-97	X				
31T06701	ME305001	TB	water	7-21-97	X				
31G00201	ME305002		water	7-21-97	X				
31G00101MS	ME241003MS	MS	water	7-15-97	X	X	X	X	
31G00101MSD	ME241003MSD	MSD	water	7-15-97	X	X	X		
31G00101DUP	ME241003DUP	DUP	water	7-15-97				X	

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matri Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF047					VALIDATION SAMPLE TABLE	LDC#: 2346A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA OLV01.0**	**Metals (2.1)**
39W028	ME243001		water	7-15-97	X	
39W027	ME243002		water	7-15-97	X	
39W024	ME243003		water	7-15-97	X	
39W032	ME243004		water	7-15-97	X	X
39W034	ME243005		water	7-15-97	X	X
39W034D	ME243006		water	7-15-97	X	X
39W031	ME243007		water	7-15-97	X	
STOR_BLK	ME243008		water	7-17-97	X	
39T10001	ME244001	TB	water	7-15-97	X	
39W001	ME244002		water	7-15-97	X	
39W002	ME244003		water	7-15-97	X	X
39W003	ME244004		water	7-15-97	X	
39W004	ME244005		water	7-15-97	X	
39W005	ME244006		water	7-15-97	X	
39W006	ME244007		water	7-15-97	X	
39W007	ME244008		water	7-15-97	X	
39W008	ME244009		water	7-15-97	X	
39W014	ME267001		water	7-16-97	X	
39W015	ME267002		water	7-16-97	X	
39W016	ME267003		water	7-16-97	X	X
39W012	ME267004		water	7-16-97	X	
39W012D	ME267005	FD	water	7-16-97	X	
39W013	ME267006		water	7-16-97	X	
39W017	ME267007		water	7-16-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1						
SDG#: WF047			**VALIDATION SAMPLE TABLE**			**LDC#:** 2346A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA OLV01.0**	**Metals (2.1)**
STOR_BLK2	ME267008		water	7-18-97	X	
39W034MS	ME243005MS	MS	water	7-15-97	X	X
39W034MSD	ME243005MSD	MSD	water	7-15-97	X	
39W034DUP	ME243005DUP	DUP	water	7-15-97		X

TP = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF048	VALIDATION SAMPLE TABLE	LDC#: 2338A

Project Name: NAS Whiting

Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)
39D002	ME245001		soil	7-15-97	X
39D001	ME245002		soil	7-15-97	X
39D007	ME245003		soil	7-15-97	X
39D023	ME264001		soil	7-16-97	X
39D026	ME264002		soil	7-16-97	X
39D016	ME264003		soil	7-16-97	X
39D013	ME264004		soil	7-16-97	X
39D019	ME264005		soil	7-17-97	X
39D018	ME264006		soil	7-17-97	X
39D018D	ME264007	FD	soil	7-17-97	X
39D022	ME264008		soil	7-17-97	X
39R03401	ME264009	R	water	7-16-97	X
39D018MS	ME264006MS	MS	soil	7-17-97	X
39D018MSD	ME264006MSD	MSD	soil	7-17-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF049 **VALIDATION SAMPLE TABLE** **LDC#:** 2347A

Project Name: NAS Whiting Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	SVOA (1.9)
39T10201	ME262001	TB	water	7-15-97	X	
39W023	ME262002		water	7-16-97	X	
39W026	ME262003		water	7-16-97	X	
39W025	ME262004		water	7-16-97	X	
39W029	ME262005		water	7-16-97	X	
39W030	ME262006		water	7-16-97	X	
39U001	ME262007		water	7-16-97	X	X
39W018	ME263001		water	7-17-97	X	
39W019	ME263002		water	7-17-97	X	
39W020	ME263003		water	7-17-97	X	
39W021	ME263004		water	7-17-97	X	
39W021D	ME263005	FD	water	7-17-97	X	
39W022	ME263006		water	7-17-97	X	
39T10401	ME263007	TB	water	7-17-97	X	
39W021MS	ME263004MS	MS	water	7-17-97	X	
39W021MSD	ME263004MSD	MSD	water	7-17-97	X	

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matr ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

SDG#: WF051 | **VALIDATION SAMPLE TABLE** | **LDC#:** 2360A

Project Name: NAS Whiting | Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16T06801	ME306001	TB	water	7-21-97	X	
16R03501	ME306002	R	water	7-21-97	X	
16G00401	ME306003		water	7-22-97	X	
16G00401D	ME306004	FD	water	7-22-97	X	
16G00402	ME306005		water	7-22-97	X	
16G00403	ME306006		water	7-22-97	X	
16T06901	ME322001	TB	water	7-22-97	X	
16G00302	ME322002		water	7-22-97	X	X
16G00303	ME322003		water	7-22-97	X	X
16G00202	ME322004		water	7-23-97	X	X
16G00203	ME322005		water	7-23-97	X	X
16T07001	ME340001	TB	water	7-23-97	X	
16G00601	ME340002		water	7-23-97	X	X
16G00601F	ME340003		water	7-23-97		X
16G00602	ME340004		water	7-23-97	X	X
16R03601	MW340005	R	water	7-23-97		X
16G00304	ME340006		water	7-24-97	X	X
16G00304F	ME340007		water	7-24-97		X
16G00301	ME340008		water	7-24-97	X	X
16G00101	ME340009		water	7-24-97	X	X
16G00101D	ME340010	FD	water	7-24-97	X	X
16T07101	ME348001	TB	water	7-25-97	X	
16G00702	ME348002		water	7-25-97	X	X
16G00702DL	ME348002DL		water	7-25-97	X	

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF051 — **VALIDATION SAMPLE TABLE** — **LDC#:** 2360A

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (CLP)
16G00703	ME348003		water	7-25-97	X	X
16G00703DL	ME348003DL		water	7-25-97	X	
16G00701	ME348004		water	7-25-97	X	X
16G00401MS	ME306003MS	MS	water	7-22-97	X	
16G00401MSD	ME306003MSD	MSD	water	7-22-97	X	

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matr ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF052				VALIDATION SAMPLE TABLE	LDC#: 2354A
Project Name: NAS Whiting				Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (OLV01.0)**
39018	ME346001		water	7-25-97	X
39019	ME346002		water	7-25-97	X
39020	ME346003		water	7-25-97	X
39021	ME346004		water	7-25-97	X
39020D	ME346005	FD	water	7-25-97	X
39029	ME346006		water	7-25-97	X
39T10501	ME346007	TB	water	7-25-97	X
STORAGEBLK	ME346008		water	7-26-97	X
39020MS	ME346003MS	MS	water	7-25-97	X
39020MSD	ME346003MSD	MSD	water	7-25-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053	VALIDATION SAMPLE TABLE	LDC#: 2384A

Project Name: NAS Whiting — Parameters/Analytical Method

Client ID #	Lab ID #	QC Type	Matrix	Date Collected	VOA (1.9)	Metals (2.1)
15T07201	ME367001	TB	water	7-27-97	X	
15R03701	ME367002	R	water	7-27-97	X	X
15G00601	ME367003		water	7-27-97	X	X
15G00602	ME367004		water	7-27-97	X	X
15G00602D	ME367005	FD	water	7-27-97	X	X
15T07301	ME377001	TB	water	7-28-97	X	
15G00201	ME377002		water	7-28-97	X	X
15G00101	ME377003		water	7-28-97	X	X
15G00202	ME377004		water	7-29-97	X	X
15G00203	ME377005		water	7-29-97	X	X
15T07401	ME390001	TB	water	7-29-97	X	
15G00301	ME390002		water	7-29-97	X	X
15G00302	ME390003		water	7-29-97	X	X
15G00701	ME390004		water	7-30-97	X	X
15G00702	ME390005		water	7-30-97	X	X
15T07501	ME404001	TB	water	7-30-97	X	
15G00401	ME404002		water	7-30-97	X	X
15G00703	ME404003		water	7-30-97	X	X
15G00703D	ME404004	FD	water	7-30-97	X	X
15G00501	ME404005		water	7-31-97	X	X
15G00501F	ME404006		water	7-31-97		X
15G00502	ME404007		water	7-31-97	X	X
15G00503	ME404008		water	7-31-97	X	X
15G00602MS	ME367004MS	MS	water	7-27-97	X	X

T Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF053					VALIDATION SAMPLE TABLE	LDC#: 2384A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**Metals (2.1)**
15G00602MSD	ME367004MSD	MSD	water	7-27-97	X	
15G00602DUP	ME367004DUP	DUP	water	7-27-97		X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF054					VALIDATION SAMPLE TABLE	LDC#: 2399A
Project Name: NAS Whiting					Parameters/Analytical Method	
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**	**Metals (2.1)**
15T07601	ME441001	TB	water	8-4-97	X	
15G00801	ME441002		water	8-4-97	X	X
15G00801D	ME441003	FD	water	8-4-97	X	X
15G00802	ME441004		water	8-4-97	X	X
15R03801	ME441005	R	water	8-5-97	X	X
15G00803	ME441006		water	8-5-97	X	X
15G00303	ME441007		water	8-5-97	X	X
30T07701	ME450001	TB	water	8-5-97	X	
30R03901	ME450002	R	water	8-6-97	X	X
30G00302	ME450003		water	8-6-97	X	X
15G00801MS	ME441002MS	MS	water	8-4-97	X	X
15G00801MSD	ME441002MSD	MSD	water	8-4-97	X	
15G00801DUP	ME441002DUP	DUP	water	8-4-97		X

Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Ma[illegible]ike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table 1

SDG#: WF055				VALIDATION SAMPLE TABLE	LDC#: 2511A
Project Name: NAS Whiting					Parameters/Analytical Method
Client ID #	**Lab ID #**	**QC Type**	**Matrix**	**Date Collected**	**VOA (1.9)**
OWT08001	MF004001	TB	water	10-27-97	X
OWR04101	MF004002	R	water	10-27-97	X
OWG00401	MF004003		water	10-27-97	X
OWG00401D	MF004004		water	10-27-97	X
13R04201	MF004005	R	water	10-28-97	X
13G00401	MF004006		water	10-28-97	X
OWG00401MS	MF004003MS	MS	water	10-27-97	X
OWG00401MSD	MF004003MSD	MSD	water	10-27-97	X

TB = Trip Blank, R = Rinsate, SB = Source Blank, FD = Field Duplicate, MS = Matrix Spike, MSD = Matrix Spike Duplicate, DUP = Duplicate

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF022	Volatiles Semivolatiles Pesticides & PCBS	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF023	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF024	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF025	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF026	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF027	Volatiles	16G00501 16G00501D 16R01501 66G02101 66G02103 66T02001	2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing Calibration (RRF)
-	Semivolatiles Pesticides & PCBs	All samples All samples	No rejected results No rejected results	- -
WF028	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF029	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF030	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF031	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF031B	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF032	Volatiles Semivolatiles	All samples All samples	No rejected results No rejected results	- -
	Pesticides & PCBs	29G00501 29G00501D	Heptachlor epoxide Heptachlor epoxide	Target compound identification (RT)
WF033	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF034	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF035	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Fraction	Sample	Compound	Reason
WF036	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF037	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF038	Volatiles	All samples	No rejected results	-
WF039	Volatiles	All samples	No rejected results	-
WF040	Volatiles	All samples	No rejected results	-
WF041	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF042	Volatiles	All samples	No rejected results	-
WF043	Volatiles	All samples	No rejected results	-
WF044	Volatiles	All samples	No rejected results	-
WF045	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF046	Volatiles Semivolatiles Pesticides & PCBs	All samples All samples All samples	No rejected results No rejected results No rejected results	- - -
WF047	Volatiles	39T10001 39W001 39W002 39W003 39W004 39W005 39W006 39W007 39W008 39W012 39W012D 39W013 39W014 39W015 39W016 39W017 39W024 39W027 39W028 39W031 39W032 39W034 39W034D STOR_BLK STOR_BLK2	Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone 2-Butanone 2-Butanone Acetone & 2-Butanone 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing Calibration (RRF)
WF048	Volatiles	All samples	No rejected results	-

Table II
Summary of Rejected Data (Organics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds				
SDG	**Fraction**	**Sample**	**Compound**	**Reason**
WF049	Volatiles	39T10201 39T10401 39W016 39W019 39W020 39W021 39W021D 39W022 39W023 39W025 39W026 39W029 39W030	Acetone & 2-Butanone Acetone & 2-Butanone Acetone 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone 2-Butanone 2-Butanone	Initial & Continuing calibration (RRF)
WF049	Semivolatiles	All samples	No rejected results	-
WF051	Volatiles	All samples	No rejected results	-
WF052	Volatiles	39G018 39G019 39G020 39G020D 39G021 39G029 39R10501 STORAGE BLK	Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone & 2-Butanone Acetone	Initial & Continuing Calibration (RRF)
WF053	Volatiles	All samples	No rejected results	-
WF054	Volatiles	All samples	No rejected results	-
WF055	Volatiles	All samples	No rejected results	-

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF022	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF023	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF024	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF025	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF026	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF027	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF028	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF029	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF030	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF031	All metals Cyanide	All samples 05G00101 05G00301 05G00801 05G00802 05G00901 05G00902 05G01001 05G01001D 05G01002 05R01901 33G00101 33G00201 33G00301 33G00301D 33G00501	No rejected results Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide Cyanide	- Matrix spike (%R)
WF031B	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF032	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF033	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF034	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF035	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF036	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF037	All metals Cyanide	All samples 15F00201	No rejected results Cyanide	- Matrix spike (%R)
WF041	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -

Table III
Summary of Rejected Data (Inorganics)
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes				
SDG	**Fraction**	**Sample**	**Analyte**	**Reason**
WF045	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF046	All metals Cyanide	All samples All samples	No rejected results No rejected results	- -
WF047	All metals	All samples	No rejected results	-
WF051	All metals	All samples	No rejected results	-
WF053	All metals	All samples	No rejected results	-
WF054	All metals	All samples	No rejected results	-

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF022	BKG00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	108	115	-	J (all detects)
		4-Nitrophenol	10-80	-	88	93	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	100	108	-	J (all detects)
		Pentachlorophenol	9-103	-	106	118	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF023	02G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	82	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	97	-	-	J (all detects)
		Pentachlorophenol	9-103	-	139	122	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF024	15G00701	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	100	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	102	106	-	J (all detects)
		Pentachlorophenol	9-103	-	147	148	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF025	15G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	99	102	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	101	103	-	J (all detects)
		Pentachlorophenol	9-103	-	124	130	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF026	15G00803	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Chloro-3-methylphenol	23-97	-	99	-	-	J (all detects)
		4-Nitrophenol	10-80	-	108	114	-	J (all detects)
		Pentachlorophenol	9-103	-	140	144	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF027	16G00501	Volatiles						
		Benzene	-	≤11	-	-	12	J
		Semivolatiles						
		4-Nitrophenol	10-80	-	91	91	-	J (all detects)
		Pentachlorophenol	9-103	-	104	104	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF028	12G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	83	-	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF029	14G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	91	-	J (all detects)
		Pentachlorophenol	9-103	-	-	106	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None
WF030	66G00601	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	85	89	-	J (all detects)
		Pesticides/PCBs	-	-	-	-	-	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF031	05G01001	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Phenol	-	≤42	-	-	50	None
		2-Chlorophenol	-	≤40	-	-	50	None
		4-Chloro-3-methylphenol	-	≤42	-	-	51	None
		4-Nitrophenol	10-80	≤50	-	95	58	None
		Pentachlorophenol	-	≤50	-	-	52	None
		1,4-Dichlorobenzene	-	≤28	-	-	45	J
		N-Nitroso-di-n-propylamine	-	≤38	-	-	56	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	41	J
		Acenaphthene	-	≤31	-	-	84	J
		2,4-Dinitrotoluene	-	≤38	-	-	52	J
		Pyrene	-	≤31	-	-	54	J
		Pesticides/PCBs	-	-	-	-	-	None
WF031B	None	Volatiles	-	-	-	-	-	-
		Semivolatiles	-	-	-	-	-	-
		Pesticides/PCBs	-	-	-	-	-	-
WF032	29G00501	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF033	66G00201	Volatiles						
		1,1-Dichloroethene	-	≤14	-	-	16	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	-	83	-	None
		Pesticides & PCBs	-	-	-	-	-	None
WF034	30G00301	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		Acenaphthene	46-118	≤31	44	-	37	None
		1,4-Dichlorobenzene	-	≤28	-	-	33	None
		1,2,4-Trichlorobenzene	-	≤28	-	-	34	None
		2,4-Dinitrotoluene	-	≤38	-	-	40	None
		Pyrene	-	≤31	-	-	36	None

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria % Recovery	Criteria RPD	% Recovery MS	% Recovery MSD	RPD	Qualifier
WF034 cont.	30G00301	Pesticides/PCBs	-	-	-	-	-	None
WF035	66G01701	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		Pesticides/PCBs	-	-	-	-	-	None
WF036	54G00101	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	101	81	-	None
		1,4-Dichlorobenzene	-	≤28	-	-	30	J
		1,2,4-Trichlorobenzene	-	≤28	-	-	36	J
		Pesticides/PCBs	-	-	-	-	-	None
WF037	15G00803	Volatiles	-	-	-	-	-	None
WF038	36BO0303	Volatiles	-	-	-	-	-	None
WF039	35BO0203	Volatiles	-	-	-	-	-	None
WF040	37BO0203	Volatiles	-	-	-	-	-	None
WF041	35G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles	-	-	-	-	-	None
		<u>Pesticides & PCBs</u>						
		Aldrin	40-120	-	124	121	-	J (all detects)
WF042	05G00902	Volatiles	-	-	-	-	-	None
WF043	05G00802	Volatiles	-	-	-	-	-	None
WF044	66G01201	<u>Volatiles</u>						
		Trichloroethene	-	≤14	-	-	40	None
WF045	OWG00502	Volatiles	-	-	-	-	-	None
		<u>Semivolatiles</u>						
		4-Nitrophenol	10-80	-	96	109	-	J (all detects)
		2,4-Dinitrotoluene	24-96	-	-	100	-	J (all detects)

Table IV
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike/Matrix Spike Duplicates
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Criteria		% Recovery		RPD	Qualifier
			% Recovery	RPD	MS	MSD		
WF045 cont.	OWG00502	Pesticides & PCBs						
		gamma-BHC	-	≤15	-	-	28	J
		Heptachlor	-	≤20	-	-	24	J
		Aldrin	40-120	≤22	-	128	29	J
		Dieldrin	52-126	≤18	-	134	22	J
		Endrin	56-121	≤21	-	144	22	J
WF046	31G00101	Volatiles	-	-	-	-	-	None
		Semivolatiles						
		4-Nitrophenol	10-80	-	88	96	-	J (all detects)
		Pesticides & PCBs						
		Endrin	56-121	-	127	-	-	J (all detects)
WF047	39W034	Volatiles	-	-	-	-	-	None
WF048	39D018	Volatiles	-	-	-	-	-	None
WF049	39W021	Volatiles	-	-	-	-	-	None
	None	Semivolatiles	-	-	-	-	-	None
WF051	16G00401	Volatiles	-	-	-	-	-	None
WF052	39020	Volatiles	-	-	-	-	-	None
WF053	15G00602	Volatiles	-	-	-	-	-	None
WF054	15G00801	Volatiles	-	-	-	-	-	None
WF055	13G00401	Volatiles	-	-	-	-	-	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF022	**Client ID**	BKG00101	BKG00101D	
	Laboratory ID	RB858003	RB858004	
	Collection Date	7/16/96	7/16/96	
	Acetone	ND	8 ug/L	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF022	**Client ID**	01G00102	01G00102D	
	Laboratory ID	RB873008	RB873009	
	Collection Date	7/19/96	7/19/96	
	Acetone	4 ug/L	2 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF023	**Client ID**	02G00301	02G00301D	
	Laboratory ID	RB887012	RB887013	
	Collection Date	7/24/96	7/24/96	
	Acetone	ND	10 ug/L	Not calculable
	Carbon disulfide	1 ug/L	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF024	**Client ID**	15G00701	15G00701D	
	Laboratory ID	RB920009	RB920010	
	Collection Date	7/31/96	7/31/96	
	Acetone	2	ND	Not calculable
	Semivolatiles	ND	ND	-
	Pesticides/PCBs	ND	ND	-
WF025	**Client ID**	15G00601	15G00601D	
	Laboratory ID	RB956006	RB956008	
	Collection Date	8/7/96	8/7/96	
	Acetone	5 ug/L	8 ug/L	46
	1,2-Dichloroethene (total)	1 ug/L	1 ug/L	0
	Chlorobenzene	5 ug/L	5 ug/L	0
	Ethylbenzene	10U ug/L	1 ug/L	Not calculable
	1,4-Dichlorobenzene	12 ug/L	12 ug/L	0
	Naphthalene	4 ug/L	4 ug/L	0
	Diethylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	-
WF026	**Client ID**	15G00803	15G00803D	
	Laboratory ID	RB980007	RB980008	
	Collection Date	8/14/96	8/14/96	
	Acetone	25 ug/L	5 ug/L	133
	2-Butanone	7 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	4 ug/L	0
	Bis(2-ethylhexyl)phthalate	2 ug/L	1 ug/L	67
	4,4'-DDT	0.16 ug/L	0.079 ug/L	68

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF026	**Client ID**	**16G00403**	**16G00403D**	
	Laboratory ID	**RB980020**	**RB980021**	
	Collection Date	**8/16/96**	**8/16/96**	
	Acetone	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	1 ug/L	2 ug/L	67
	Benzene	600 ug/L	600 ug/L	0
	Phenol	8 ug/L	8 ug/L	0
	Naphthalene	1 ug/L	2 ug/L	67
	Bis(2-ethylhexyl)phthalate	1 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF026	**Client ID**	**16G00403DL**	**16G00403DDL**	
	Laboratory ID	**RB980020DL**	**RB9890021DL**	
	Collection Date	**8/16/96**	**8/16/96**	
	Acetone	18 ug/L	24 ug/L	29
	Benzene	700 ug/L	740 ug/L	6
WF027	**Client ID**	**16G00501**	**16G00501D**	
	Laboratory ID	**RC016009**	**RC016013**	
	Collection Date	**8/21/96**	**8/21/96**	
	Volatiles	ND	ND	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF027	**Client ID**	**09G00301**	**09G00301D**	
	Laboratory ID	**RC016019**	**RC016020**	
	Collection Date	**8/23/96**	**8/23/96**	
	Acetone	46 ug/L	18 ug/L	88
	2-Butanone	2 ug/L	10U ug/L	Not calculable
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF028	**Client ID**	**11G00201**	**11G00201D**	
	Laboratory ID	**RC044011**	**RC044018**	
	Collection Date	**8/28/96**	**8/28/96**	
	Acetone	5 ug/L	11 ug/L	75
	Phenol	4 ug/L	6 ug/L	40
	Bis(2-ethylhexyl)phthalate	5 ug/L	4 ug/L	22
	Pesticides/PCBs	ND	ND	None
WF028	**Client ID**	**12G00101**	**12G00101D**	
	Laboratory ID	**RC044012**	**RC044017**	
	Collection Date	**8/27/96**	**8/27/96**	
	Acetone	3 ug/L	6 ug/L	67
	Bis(2-ethylhexyl)phthalate	2 ug/L	2 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Acetone	8 ug/L	4 ug/L	67
	Carbon disulfide	3 ug/L	10U ug/L	Not calculable
	Methylene chloride	1 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	4 ug/L	4 ug/L	0
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Acetone	2 ug/L	8 ug/L	120
	Methylene chloride	2 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	3 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Acetone	4 ug/L	10U ug/L	Not calculable
	Bis(2-ethylhexyl)phthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	1,1-Dichloroethene	5 ug/L	6 ug/L	18
	1,2-Dichloroethene (total)	4 ug/L	3 ug/L	29
	Trichloroethene	300 ug/L	300 ug/L	0
	Di-n-butylphthalate	1 ug/L	1 ug/L	0
	Pesticides/PCBs	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Volatiles	ND	ND	None
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Trichloroethene	1 ug/L	1 ug/L	0
	Toluene	1 ug/L	1 ug/L	0
	Semivolatiles	ND	ND	None
	Pesticides/PCBs	ND	ND	None
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	1,2-Dichloroethene (total)	31 ug/L	31 ug/L	0
	Trichloroethene	340 ug/L	340 ug/L	0
	Di-n-butylphthalate	2 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Volatiles	ND	ND	None
	Di-n-butylphthalate	3 ug/L	2 ug/L	40
	Pesticides/PCBs	ND	ND	None
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Volatiles	ND	ND	None
	Diethylphthalate	1 ug/L	10U ug/L	Not calculable
	Di-n-butylphthalate	1 ug/L	10U ug/L	Not calculable
	Pesticides/PCBs	ND	ND	None
WF037	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**MC424007**	**MC424008**	
	Collection Date	**11/20/96**	**11/20/96**	
	Trichloroethene	5 ug/L	5 ug/L	0
WF038	**Client ID**	**36BO0303**	**36BO0303D**	
	Laboratory ID	**MC687010**	**MC687011**	
	Collection Date	**12/17/96**	**12/17/96**	
	Volatiles	ND	ND	None

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF038	**Client ID**	36BO0403	36BO0403D	
	Laboratory ID	MC687014	MC687015	
	Collection Date	12/18/96	12/18/96	
	Volatiles	ND	ND	None
WF039	**Client ID**	35BO0302	35BO0302D	
	Laboratory ID	MC698013	MC698015	
	Collection Date	12/21/96	12/21/96	
	Volatiles	ND	ND	None
WF039	**Client ID**	35BO0203	35BO0203D	
	Laboratory ID	MC698010	MC698016	
	Collection Date	12/21/96	12/21/96	
	Volatiles	ND	ND	None
WF040	**Client ID**	37BO0203	37BO0203D	
	Laboratory ID	MC783010	MC783018	
	Collection Date	1/8/97	1/8/97	
	Acetone	14 ug/Kg	12 ug/Kg	15
	Methylene chloride	2 ug/Kg	10 ug/Kg	133
WF040	**Client ID**	37BO0103	37BO0103D	
	Laboratory ID	MC783013	MC783019	
	Collection Date	1/8/97	1/8/97	
	Acetone	18 ug/Kg	22 ug/Kg	20
	Methylene chloride	3 ug/Kg	11 ug/Kg	114
WF041	**Client ID**	35G00101	35G00101D	
	Laboratory ID	MD908004	MD908005	
	Collection Date	6/11/97	6/11/97	
	<u>Volatiles</u>			
	1,1-Dichlcroethene	6 ug/L	7 ug/L	15
	1,1,1-Trichloroethane	2 ug/L	2 ug/L	0
	Xylene (total)	2 ug/L	1 ug/L	67
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF041	**Client ID**	35G00202	35G00202D	
	Laboratory ID	MD950002	MD950003	
	Collection Date	6/15/97	6/15/97	
	<u>Volatiles</u>			
	Chloroform	3 ug/L	3 ug/L	0
	<u>Semivolatiles</u>			
	Bis(2-ethylhexyl)phthalate	10U ug/L	5 ug/L	Not calculable
	Pesticides & PCBs	ND	ND	-
WF042	**Client ID**	05G00902	05G00902D	
	Laboratory ID	ME007004	ME007005	
	Collection Date	6/19/97	6/19/97	
	Volatiles	ND	ND	-

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF043	**Client ID**	05G00802	05G00802D	
	Laboratory ID	ME042004	ME042005	
	Collection Date	6/24/97	6/24/97	
	Volatiles			
	Benzene	1 ug/L	10U ug/L	Not calculable
	Trichloroethene	4 ug/L	10U ug/L	Not calculable
	Xylenes (total)	1 ug/L	10U ug/L	Not calculable
WF043	**Client ID**	07G00101	07G00101D	
	Laboratory ID	ME087002	ME087003	
	Collection Date	6/26/97	6/26/97	
	Acetone	540 ug/L	490 ug/L	10
	Benzene	3900 ug/L	4400 ug/L	12
	Toluene	14000 ug/L	16000 ug/L	13
	Ethylbenzene	1800 ug/L	2000 ug/L	10
	Xylenes, total	3200 ug/L	3600 ug/L	12
WF044	**Client ID**	66G01201	66G01201D	
	Laboratory ID	ME110002	ME110003	
	Collection Date	6/30/97	6/30/97	
	Volatiles			
	1,1-Dichloroethene	3 ug/L	2 ug/L	40
	1,2-Dichloroethene (total)	3 ug/L	3 ug/L	0
	Trichloroethene	120 ug/L	96 ug/L	22
WF044	**Client ID**	66G00603	66G00603D	
	Laboratory ID	ME135002	ME135003	
	Collection Date	7/2/97	7/2/97	
	Volatiles			
	Trichloroethene	1 ug/L	1 ug/L	0
WF045	**Client ID**	OWG00502	OWG00502D	
	Laboratory ID	ME149004	ME149005	
	Collection Date	7/8/97	7/8/97	
	Volatiles			
	Acetone	3 ug/Kg	2 ug/Kg	40
	Semivolatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
WF045	**Client ID**	OWG00302	OWG00302D	
	Laboratory ID	ME190002	ME190003	
	Collection Date	7/10/97	7/10/97	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	4 ug/L	6 ug/L	40
WF046	**Client ID**	31G00101	31G00101D	
	Laboratory ID	ME241003	ME241004	
	Collection Date	7/15/97	7/15/97	
	Volatiles	ND	ND	-
	Pesticides & PCBs	ND	ND	-
	Semivolatiles			
	Di-n-butylphthalate	6 ug/L	3 ug/L	67

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF047	**Client ID**	**39W034**	**39W034D**	
	Laboratory ID	**ME243005**	**ME243006**	
	Collection Date	**7/15/97**	**7/15/97**	
	Volatiles			
	Acetone	4 ug/L	5U ug/L	Not calculable
	Carbon disulfide	1U ug/L	1 ug/L	Not calculable
WF047	**Client ID**	**39W012**	**39W012D**	
	Laboratory ID	**ME267004**	**ME267005**	
	Collection Date	**7/16/97**	**7/16/97**	
	Volatiles			
	Methylene chloride	2U ug/L	1 ug/L	Not calculable
	Benzene	2 ug/L	2 ug/L	0
WF048	**Client ID**	**39D018**	**39D018D**	
	Laboratory ID	**ME264006**	**ME264007**	
	Collection Date	**7/17/97**	**7/17/97**	
	Volatiles			
	Acetone	27 ug/Kg	27 ug/Kg	0
	Trichloroethene	2 ug/Kg	2 ug/Kg	0
WF049	**Client ID**	**39W021**	**39W021D**	
	Laboratory ID	**ME263004**	**ME263005**	
	Collection Date	**7/17/97**	**7/17/97**	
	Volatiles	ND	ND	-
WF051	**Client ID**	**16G00401**	**16G00401D**	
	Laboratory ID	**ME306003**	**ME306003**	
	Collection Date	**7/22/97**	**7/22/97**	
	Volatiles			
	Acetone	18 ug/L	14 ug/L	25
WF051	**Client ID**	**16G00101**	**16G00101D**	
	Laboratory ID	**ME340009**	**ME340010**	
	Collection Date	**7/24/97**	**7/24/97**	
	Volatiles	ND	ND	-
WF052	**Client ID**	**39020**	**39020D**	
	Laboratory ID	**ME346004**	**ME346005**	
	Collection Date	**7/25/97**	**7/25/97**	
	Volatiles	ND	ND	-
WF053	**Client ID**	**15G00602**	**15G00602D**	
	Laboratory ID	**ME367004**	**ME367005**	
	Collection Date	**7/27/97**	**7/27/97**	
	Volatiles			
	Trichloroethene	2 ug/L	2 ug/L	0
WF053	**Client ID**	**15G00703**	**15G00703D**	
	Laboratory ID	**ME404003**	**ME404004**	
	Collection Date	**7/30/97**	**7/30/97**	
	Volatiles			
	1,2-Trichloroethene (total)	1 ug/L	2 ug/L	67
	Trichloroethene	36 ug/L	38 ug/L	5
	1,1-Dichloroethene	2 ug/L	10U ug/L	Not calculable

Table V
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Organic Compounds			RPD
WF054	**Client ID** **Laboratory ID** **Collection Date**	15G00801 ME441002 8/4/97	15G00801D ME441003 8/4/97	
	Volatiles Chlorobenzene	4 ug/L	4 ug/L	0
WF055	**Client ID** **Laboratory ID** **Collection Date**	OWG00401 MF004003 10/27/97	OWG00401D MF004004 10/27/97	
	Volatiles	ND	ND	-

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF022	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			10	
	BKR01001	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	BKG00101	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	57	60-150		J
	BKG00102	Decachlorobiphenyl	37	60-150		J
		Decachlorobiphenyl	37	60-150		J
	BKG00103	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	41	60-150		J
	BKG00202	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	BKG00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	43	60-150		J
	BKF01001	Tetrachloro-m-xylene	59	60-150		J
		Tetrachloro-m-xylene	59	60-150		J
		Decachlorobiphenyl	51	60-150		J
		Decachlorobiphenyl	47	60-150		J
	17G00101	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	56	60-150		J
	17G00201	Decachlorobiphenyl	22	60-150		J
		Decachlorobiphenyl	21	60-150		J
	01G00102D	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	56	60-150		J
WF023	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	01G00201	Decachlorobiphenyl	32	60-150		J
		Decachlorobiphenyl	28	60-150		J
	01G00301	Decachlorobiphenyl	49	60-150		J
		Decachlorobiphenyl	47	60-150		J
	02G00101	Decachlorobiphenyl	41	60-150		J
		Decachlorobiphenyl	42	60-150		J
	16G00703	Decachlorobiphenyl	59	60-150		J
		Decachlorobiphenyl	55	60-150		J
	18G00301	Decachlorobiphenyl	48	60-150		J
		Decachlorobiphenyl	46	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF024	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	BKG00203	Decachlorobiphenyl	52	60-150	-	J
		Decachlorobiphenyl	48	60-150	-	J
WF025	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	15G00101	Decachlorobiphenyl	21	60-150		J
		Decachlorobiphenyl	20	60-150		J
	15G00303	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
	15G00502	Tetrachloro-m-xylene	155	60-150		J (all detects)
		Tetrachloro-m-xylene	162	60-150		J (all detects)
	15R01301	Decachlorobiphenyl	59	60-150		J
	15G00502RE	Decachlorobiphenyl	53	60-150		J
		Decachlorobiphenyl	54	60-150		J
WF026	All	Volatiles	All within QC limits	-	-	None
		Semivolatiles			2	
	15G00802	2-Fluorobiphenyl	161	43-116		J (all detects) all B/N
		Terphenyl-d14	163	33-141		J (all detects) all B/N
	15G00802R	2-Fluorobiphenyl	182	43-116		J (all detects) all B/N
		Terphenyl-d14	153	33-141		J (all detects) all B/N

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF026 cont.		Pesticides/PCBs			9	
	15G00201	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	50	60-150		J
	15G00202	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	15G00801	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	38	60-150		J
	15G00803	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
	16G00201	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	37	60-150		J
	16G00203	Decachlorobiphenyl	44	60-150		J
		Decachlorobiphenyl	43	60-150		J
	16G00403	Decachlorobiphenyl	40	60-150		J
		Decachlorobiphenyl	39	60-150		J
	16G00403D	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	46	60-150		J
	16G00601	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	25	60-150		J
WF027	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			2	
	16G00304	Decachlorobiphenyl	46	60-150		J
		Decachlorobiphenyl	43	60-150		J
	66G02103	Decachlorobiphenyl	58	60-150		J
		Decachlorobiphenyl	58	60-150		J
WF028	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			5	
	10G00101	Decachlorobiphenyl	50	60-150		J
		Decachlorobiphenyl	48	60-150		J
	11G00101	Decachlorobiphenyl	47	60-150		J
		Decachlorobiphenyl	47	60-150		J
	11G00301	Decachlorobiphenyl	25	60-150		J
		Decachlorobiphenyl	24	60-150		J
	11G00401	Decachlorobiphenyl	29	60-150		J
		Decachlorobiphenyl	29	60-150		J
	11G00201D	Decachlorobiphenyl	59	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF029	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	13G00101	Decachlorobiphenyl	23	60-150		J
		Decachlorobiphenyl	23	60-150		J
	66G00901	Decachlorobiphenyl	43	60-150		J
		Decachlorobiphenyl	42	60-150		J
	66G00903	Decachlorobiphenyl	52	60-150		J
		Decachlorobiphenyl	52	60-150		J
WF030	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G00804	Decachlorobiphenyl	31	60-150		J
		Decachlorobiphenyl	31	60-150		J
WF031	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	05G00301	Tetrachloro-m-xylene	56	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	05G00101	Decachlorobiphenyl	164	60-150		J (all detects)
	05G01002	Tetrachloro-m-xylene	57	60-150		J
WF031B	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF032	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	29G00101	Pesticides/PCBs			1	
		Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	56	60-150		J

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF033	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			3	
	07G00101	Tetrachloro-m-xylene	174	60-150		J (all detects)
	30G00501	Tetrachloro-m-xylene	59	60-150		J
	66G00201D	Tetrachloro-m-xylene	25	60-150		J
		Tetrachloro-m-xylene	36	60-150		J
WF034	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	66G01801	Tetrachloro-m-xylene	164	60-150		J (all detects)
WF035	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	08G00101	Tetrachloro-m-xylene	59	60-150		J
WF036	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides/PCBs			1	
	54G00101	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF037	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
	All	Pesticides/PCBs	All within QC limits	-	-	None
WF038	All	Volatiles	All within QC limits	-	-	None
WF039	All	Volatiles	All within QC limits	-	-	None
WF040	All	Volatiles	All within QC limits	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF041	All	Volatiles	All within QC limits	-	-	None
	All	Semivolatiles	All within QC limits	-	-	None
		Pesticides & PCBs			2	
	35G00201	Decachlorobiphenyl	58	60-150		J
	36G00103	Tetrachloro-m-xylene	57	60-150		J
		Tetrachloro-m-xylene	58	60-150		J
WF042	All	Volatiles	-	-	-	None
WF043	All	Volatiles	-	-	-	None
WF044	All	Volatiles	-	-	-	None
WF045	All	Volatiles	-	-	-	None
		Semivolatiles			3	
	OWG00101	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
	OWG00102	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF045 cont.	OWG00103	2-Fluorophenol	0	21-110		J (all detects)
		Phenol-d5	0	10-110		R (all non-detects)
		2-Chlorophenol-d4	0	33-110		
		1,2-Dichlorobenzene-d4	0	16-110		
		Nitrobenzene-d5	0	35-114		
		2-Fluorobiphenyl	0	43-116		
		2,4,6-Tribromophenol	0	10-123		
		Terphenyl-d14	0	33-141		
		Pesticides & PCBs			4	
	OWG00101	Tetrachloro-m-xylene	45	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00103	Tetrachloro-m-xylene	59	60-150		J
	OWG00302	Tetrachloro-m-xylene	54	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
	OWG00302D	Tetrachloro-m-xylene	53	60-150		J
		Tetrachloro-m-xylene	52	60-150		J
WF046	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
		Pesticides & PCBs			2	
	31G00101	Tetrachloro-m-xylene	48	60-150		J
		Tetrachloro-m-xylene	55	60-150		J
	31R03301	Tetrachloro-m-xylene	59	60-150		J
WF047	All	Volatiles	-	-	-	None
WF048	All	Volatiles	-	-	-	None
WF049	All	Volatiles	-	-	-	None
	All	Semivolatiles	-	-	-	None
WF051	All	Volatiles	-	-	-	None
WF052	All	Volatiles	-	-	-	None
WF053	All	Volatiles	-	-	-	None
WF054	All	Volatiles	-	-	-	None

Table VI
Summary of Surrogate Recoveries
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Client ID	Compound	Percent Recovery	QC Limits	# of Samples	Qualifier
WF055	All	Volatiles	-	-	-	None

Notes: J = estimated value
UJ = undetected, but number that is reported as the quantification limit is an estimated value.

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF022		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/19/96	Chloromethane	-	28.8	J
		Chloroethane	-	48.7	J
	7/22/96	Chloroethane	-	30.6	J
		Semivolatiles			
	8/13/96	4,6-Dinitro-2-methylphenol	-	27.2	J
		Pentachlorophenol	-	25.4	J
	8/14/96	4-Chloroaniline	-	31.6	J
		2,4-Dinitrophenol	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	33.8	J
	All	Pesticides/PCBs	-	-	None
WF023		Volatiles			
	6/25/96	Acetone	30.2	-	J
	7/25/96	Acetone	-	33.2	J
	7/31/96	Acetone	-	30.4	J
		Methylene chloride	-	31.7	J
		Carbon disulfide	-	27.2	J
	8/1/96	Chloroethane	-	27.5	J
		Carbon disulfide	-	27.5	J
		Methylene chloride	-	37.8	J
		Semivolatiles			
	8/20/96	4-Nitroaniline	-	37.8	J
		Chrysene	-	27.8	J
	8/21/96	4-Nitroaniline	-	31.5	J
		Chrysene	-	28.5	J
		Benzo(g,h,i)perylene	-	32.7	J
	8/25/96	4,4'-DDT	23.6	-	J
WF024		Volatiles			
	6/25/96	Acetone	30.2	-	J
	8/5/96	Acetone	33.8	-	J
	8/2/96	Chloroethane	-	29.5	J
		Carbon disulfide	-	30.8	J
		Methylene chloride	-	41.0	J
		Semivolatiles			
	8/21/96	4-Nitroaniline	-	28.7	J
		Chrysene	-	29.5	J
		Indeno(1,2,3-cd)pyrene	-	28.1	J
		Dibenz(a,h)anthracene	-	34.0	J
		Benzo(g,h,i)perylene	-	37.6	J
	All	Pesticides/PCBs	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF025		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/14/96	Chloromethane	26.7	-	J
		Chloroethane	28.5	-	J
		Acetone	29.7	-	J
		Semivolatiles			
	9/9/96	2,4-Dinitrophenol	-	29.9	J
		4-Nitroaniline	-	27.6	J
		4,6-Dinitro-2-methylphenol	-	30.7	J
		Pyrene	-	30.0	J
		3,3'-Dichlorobenzidine	-	37.0	J
		2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
		Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	8/25/96	4,4'-DDT	23.6	-	J
WF026		Volatiles			
	8/5/96	Acetone	33.8	-	J
	8/19/96	Chloromethane	-	46.5	J
		Chloroethane	-	77.1	J
		1,1-Dichloroethane	-	28.6	J
		2-Butanone	-	30.3	J
	8/20/96	Chloromethane	-	32.5	J
		Chloroethane	-	32.4	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
		Semivolatiles			
	9/10/96	2,4-Dinitrophenol	-	35.6	J
		4-Nitroaniline	-	29.4	J
		4,6-Dinitro-2-methylphenol	-	32.0	J
	-	Pentachlorophenol	-	27.8	J
		3,3'-Dichlorobenzidine	-	27.8	J
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
		Pesticides & PCBs			
	9/14/96	alpha-BHC	22.2	-	J
		delta-BHC	22.1	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF027		Volatiles			
	9/1/96	2-Butanone	39.1	-	J
		2-Butanone	0.014 (RRF)	-	J(detects) / R(ND)
	8/5/96	Acetone	33.8	-	J
	9/2/96	Acetone	-	102.4	J
		2-Butanone	-	36.3	J
	8/22/96	Acetone	-	37.9	J
		Carbon disulfide	-	28.0	J
		2-Butanone	-	27.8	J
	8/29/96	Bromomethane	-	31.0	J
		Chloroethane	-	63.9	J
		Acetone	-	37.2	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
		2-Butanone	-	0.019 (RRF)	J (detects) / R (ND)
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J
		Semivolatiles			
	9/10/96	4-Chloroaniline	-	36.8	J
		3-Nitroaniline	-	37.9	J
		2,4-Dinitrophenol	-	29.3	J
		4-Nitroaniline	-	49.5	J
		4,6-Dinitro-2-methylphenol	-	29.4	J
		Pentachlorophenol	-	29.6	J
		3,3'-Dichlorobenzidine	-	54.1	J
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	All	Pesticides/PCBs	-	-	None
WF028		Volatiles			
	8/5/96	Acetone	33.8	-	J
	9/2/96	Chloromethane	-	32.4	J
		Chloroethane	-	28.4	J
		Acetone	-	49.2	J
		2-Butanone	-	38.7	J
		4-Methyl-2-pentanone	-	35.7	J
		2-Hexanone	-	38.9	J
	9/3/96	Chloromethane	-	27.4	J
		Acetone	-	34.7	J
		2-Butanone	-	32.6	J
		4-Methyl-2-pentanone	-	32.9	J
		2-Hexanone	-	38.9	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF028 cont.	9/6/96	Chloromethane	-	35.4	J
		Acetone	-	41.0	J
		2-Butanone	-	41.8	J
		1,2-Dichloropropane	-	27.6	J
		4-Methyl-2-pentanone	-	40.5	J
		2-Hexanone	-	43.3	J
		Bromoform	-	26.2	J
		1,1,2,2-Tetrachloroethane	-	26.5	J
		Semivolatiles			
	9/20/96	3,3'-Dichlorobenzidine	-	30.4	J
	9/26/96	Benzo(k)fluoroanthene	-	28.5	J
	All	Pesticides/PCBs	-	-	None
WF029		Volatiles			
	9/17/96	Chloromethane	-	38.1	J
		Methylene chloride	-	33.6	J
	9/18/96	2-Hexanone	-	26.5	J
		Semivolatiles			
	9/26/96	Benzo(k)fluoranthene	-	28.5	J
	9/26/96	Benzo(k)fluoranthene	-	25.6	J
	All	Pesticides/PCBs	-	-	None
WF030		Volatiles			
	9/20/96	Methylene chloride	-	35.2	J
	9/23/96	Methylene chloride	-	30.2	J
		Semivolatiles			
	10/16/96	2,4-Dinitrophenol	-	25.8	J
		4-Nitrophenol	-	28.0	J
	All	Pesticides/PCBs	-	-	None
WF031	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF031B	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
	12/9-10/97	Alpha-BHC	23.9	-	J
WF032		Volatiles			
	10/10/96	1,1,2,2-Tetrachloroethane	-	27.8	J
		Semivolatiles			
	11/3/96	Hexachlorobutadiene	-	33.5	J
		Hexachlorocyclopentadiene	-	31.5	J
		Di-n-octylphthalate	-	27.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF033		Volatiles			
	10/16/96	Acetone	-	25.3	J
		Semivolatiles			
	11/4/96	Hexachlorobutadiene	-	31.2	J
		Hexachlorocyclopentadiene	-	27.9	J
	All	Pesticides/PCBs	-	-	None
WF034	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Di-n-octylpthalate	-	33.9	J
	All	Pesticides/PCBs	-	-	None
WF035	All	Volatiles	-	-	None
		Semivolatiles			
	11/26/96	Bis(2-ethylhexyl)phthalate	-	25.6	J
		Di-n-octylphthalate	-	32.1	J
	11/27/96	Di-n-octylphthalate	-	30.0	J
		Pesticides & PCBs			
	11/5/96	delta-BHC	21.2	-	J
WF036	All	Volatiles	-	-	None
		Semivolatiles			
		Di-n-octylphthalate	-	30.0	J
		Di-n-octylphthalate	-	25.3	J
		Pesticides & PCBs			
		alpha-BHC	23.9	-	J
WF037	All	Volatiles	-	-	None
		Semivolatiles			
	11/28/96	Di-n-octylphthalate	-	25.3	J
	-	Pesticides & PCBs			
	12/9-10/96	alpha-BHC	23.9	-	J
WF038		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF039		Volatiles			
	12/26/96	Acetone	-	30.6	J
WF040	All	Volatiles	-	-	None
WF041	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	6/11-12/97	Methoxychlor	24.2	-	J
		delta-BHC	21.5	-	J
WF042	All	Volatiles	-	-	None
WF043	All	Volatiles	-	-	None

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF044		Volatiles			
	7/7/97	Bromomethane	-	33.5	J
WF045	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF046	All	Volatiles	-	-	None
	All	Semivolatiles	-	-	None
		Pesticides & PCBs			
	7/31/97	alpha-BHC	20.3	-	J
		alpha-BHC	24.2	-	J
		gamma-BHC	21.9	-	J
WF047		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 RRF	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 RRF	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/29/97	Bromomethane	-	30.5	J
		Acetone	-	30.9	J
	7/21/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	7/29/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF048		Volatiles			
	7/25/97	Bromomethane	36.5	-	J
	7/26/97	Bromomethane	-	28.7	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF049		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/28/97	Bromomethane	-	34.6	J
		Acetone	-	35.1	J
	7/22/97	Acetone	-	0.020 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.030 (RRF)	J (all detects) R (all non-detects)
	7/28/97	Acetone	-	0.015 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
	All	Semivolatiles	-	-	None
WF051	All	Volatiles	-	-	None
WF052		Volatiles			
	7/21/97	Acetone	35.4	-	J
	7/21/97	Acetone	0.023 (RRF)	-	J (all detects) R (all non-detects)
		2-Butanone	0.030 (RRF)	-	J (all detects) R (all non-detects)
	7/29/97	Bromomethane	-	30.5	J
		Acetone	-	30.9	J
	7/29/97	Acetone	-	0.016 (RRF)	J (all detects) R (all non-detects)
		2-Butanone	-	0.026 (RRF)	J (all detects) R (all non-detects)
WF053		Volatiles			
	8/8/97	Acetone	-	36.4	J
WF054		Volatiles			
	8/19/97	Acetone	39.1	-	J
	8/8/97	Acetone	-	36.4	J
	8/19/97	Acetone	-	30.3	J

Table VII
Summary of Compounds Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Date	Compound	Initial Calibration %RSD	Continuing Calibration %D	Qualifier
WF055	All	Volatiles	-	-	None

Notes: %RSD = percent Relative Standard Deviation for initial calibrations

%D = percent Difference for continuing calibrations

J = the compound was positively identified; the associated numerical value is the approximate concentration of the compound in the sample, either because its concentration was lower than the QL (laboratory "J" flag), or because QC criteria were not met (validation "J").

UJ = the compound was not detected above the reported sample QL. However, the reported sample QL is approximate; the compound concentration may not reliably be presumed to be less than the QL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the compound cannot be verified.

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF022	Volatiles Acetone	8 ug/L	BKT01001 BKR01001 BKG00101 BKG00101D BKG00102 BKG00103
	Methylene chloride Acetone	1 ug/L 16 ug/L	BKG00202 BKG00201 BKF01001
	Acetone	14 ug/L	17T01101 17G00102 17G00101 17G00201 17G00301 01G00101 01G00102 01G00102D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF023	Volatiles Methylene chloride Acetone	2 ug/L 15 ug/L	01T01201 01G00401 01G00201 01G00301 BKG00301 02G00201 02G00101 18G00301 02G00301 02G00301D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF024	Volatiles Acetone	2 ug/L	18T01401 18G00101 15G00401 BKG00203 15R01201 15G00701
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF025	Volatiles Acetone	3 ug/L	15G00503DL 15R01301 15T01601 15G00301 15G00302 15G00303 15G00101 15G00203
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF026	Volatiles Acetone	11 ug/L	15T01701 15G00202 15G00201 15G00802 15G00801 16G00201 15G00803D 15R01401
	Acetone	4 ug/L	15G00803 16T01801 16G00202 16G00203
	Acetone	5 ug/L	16G00202DL 16G00602 16G00601 16G00403 16G00403DL 16G00403D 16G00403DDL
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF027	Volatiles Acetone	5 ug/L	16G00401 16G00402 16G00101 16G00301
	Acetone	5 ug/L	09G00301
	Acetone Trichloroethene Xylenes (total)	6 ug/L 1 ug/L 2 ug/L	16G00501 16R01501 16G00501D 66T02001 66G02101 66G02103
	Acetone	11 ug/L	16G00303 66G02102 09G00101 09G00301D
	Semivolatiles Pesticides/PCBs	ND ND	- -
WF028	Volatiles Acetone	5 ug/L	10T02101 09G00201 10G00201 11G00102 11G00401 11T02201 11G00301
	Acetone	11 ug/L	10G00101 11G00402 11G00201 12G00201

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF028 cont.	Acetone Carbon disulfide	5 ug/L 6 ug/L	11G00101 12G00101 11R01601 12G00101D 11G00201D
	Semivolatiles	ND	-
	Pesticides/PCBs	ND	-
WF029	Volatiles Acetone	3 ug/L	13T02301 13G00101 13R01701
	Acetone	3 ug/L	13G00102 13G00201 13G00103 14G00201 14G00101 14G00101D 66T02401 66G00901 66G00904 66G00902 66G00903
	Semivolatiles Bis(2-ethylhexyl)phthalate	1 ug/L	All samples in SDG WF029
	Pesticides/PCBs	ND	-
WF030	Volatiles Acetone	3 ug/L	66T02501 66G00801 66G00802 66G00803 66G00804
	Semivolatiles Bis(2-ethylhexyl)phthalate	2 ug/L	All samples in SDG WF030
	Pesticides/PCBs	ND	-
WF031	Volatiles	ND	-
	Semivolatiles Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	 3 ug/L 3 ug/L	05G00801 05G00802 05G00901 05G00902
	Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	2 ug/L 2 ug/L	05G01001 05G00301 05R01901 05G01001D
	Di-n-butylphthalate	2 ug/L	05G00101 33G00501 33G00201 33G00101 33G00301 33G00301D
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF031B	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF032	Volatiles	ND	-
	Semivolatiles Di-n-butylphthalate	1 ug/L	33G00401 06G00102 06G00101 06G00301 06R02001 29G00501 29G00501D
	Di-n-butylphthalate	3 ug/L	29G00101 66G01201 66G00102
	Pesticides/PCBS	ND	-
WF033	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF034	Volatiles	ND	-
	Semivolatiles Bis(2-ethylhexyl)phthalate	2 ug/L	66G01101 66G01301 66G00501
	Pesticides/PCBs	ND	-
WF035	Volatiles Semivolatiles Pesticides/PCBs	ND ND ND	- - -
WF036	Volatiles	ND	-
	Semivolatiles Di-n-butylphthalate	2 ug/L	66G00701 54G00201 54G00101 31G00201 54R02401 54G00101D
	Pesticides/PCBs	ND	-
WF037	Volatiles	ND	-
	Semivolatiles Di-n-butylphthalate	4 ug/L	All samples in SDG WF037
	Pesticides/PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF038	Volatiles Acetone	 7 ug/Kg	36BO0101 36BO0102 36BO0103 36BO0201 36BO0202 36BO0203 36BO0301 36BO0302 36BO0303 36BO0303D 36BO0401 36BO0402 36BO0403 36BO0403D
WF039	Volatiles Acetone	 7 ug/Kg	35BO0203D
	Methylene chloride	4 ug/Kg	35BO0102DL 35BO0105 35BO0201
WF040	Volatiles Acetone Bromomethane	 3 ug/L 2 ug/L	All water samples in SDG WF040
	Acetone	3 ug/Kg	35BO0402 35BO0501 35BO0501DL 35BO0502 37BO0201 37BO0202 37BO0101 37BO0102 37BO0103 37BO0301 37BO0302 37BO0303 37BO0203D 37BO0103D
WF041	Volatiles Pesticides & PCBs	ND ND	- -
	Semivolatiles Di-n-butylphthalate Bis(2-ethylhexyl)phthalate	 1 ug/L 2 ug/L	13G00301 13G00401
WF042	Volatiles	ND	-
WF043	Volatiles Acetone	 6 ug/L	 33T05301 06G00102 06G00301 33G00401
WF044	Volatiles Acetone	 3 ug/L	66T05601 66G01201 66G01201D 66G00102 66G01301

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF044 cont.	Acetone	11 ug/L	66T05701 66G00401 66G02001 66T05801 66G00603 66G00603D 66G00604 66G00601 66G00602
WF045	Volatiles Acetone	5ug/L	OWT05901 OWR03401 OWG00501 OWG00502 OWG00502D OWG00503 OWT06001 OWG00101 OWG00102 OWG00103 66T06101 66G02301 66G02302 66G02303
	Acetone	5 ug/L	OWT06201 OWG00302 OWG00302D OWG00303 OWG00301 OWT06401 OWT06401DL OWG00401 OWG00201
	Semivolatiles Di-n-butylphthalate	2 ug/L	OWR03401 OWG00501 OWG00502 OWG00502D OWG00503
	Phenol 2-Chlorophenol 1,4-Dichlorobenzene N-Nitroso-di-n-propylamine 1,2,4-Trichlorobenzene 4-Chloro-3-methylphenol Acenaphthylene Acenaphthene 4-Nitrophenol 2,4-Dinitrotoluene Pentachlorophenol Pyrene	72 ug/L 67 ug/L 33 ug/L 49 ug/L 36 ug/L 62 ug/L 12 ug/L 39 ug/L 69 ug/L 43 ug/L 65 ug/L 42 ug/L	OWG00101 OWG00102 OWG00103
	Di-n-butylphthalate	5 ug/L	66G02301 66G02302 66G02303
	Di-n-butylphthalate	4 ug/L	OWG00401 OWG00201
	Pesticides & PCBs	ND	-

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Compound	Concentration	Associated Samples
WF046	Volatiles		
	2-Butanone	4 ug/L	All samples in SDG WF046
	Semivolatiles		31R03301
	Di-n-butylphthalate	3 ug/L	31G00101
			31G00101D
	Pesticides & PCBs	ND	-
WF047	Volatiles		39W028
	Acetone	4 ug/L	39W027
			39W024
			39W032
			39W034D
			39W031
			39T10001
			39W001
			39W002
			39W003
			39W004
			39W005
WF048	Volatiles		39R03401
	2-Butanone	4 ug/L	
	Acetone	3 ug/Kg	39D002
	2-Butanone	4 ug/Kg	39D001
			39D007
			39D023
			39D026
			39D016
			39D013
			39D019
			39D018
			39D018D
			39D022
WF049	Volatiles		39U001
	2-Butanone	4 ug/L	
	Semivolatiles	ND	-
WF051	Volatiles		16T06801
	2-Butanone	4 ug/L	16R03501
WF052	Volatiles	ND	-
WF053	Volatiles		15G00602D
	Methylene chloride	8 ug/L	15T07501
			15G00401
			15G00703
			15G00703D
			15G00501
			15G00502
			15G00503
WF054	Volatiles	4 ug/L	30T07701
	Acetone		30R03901
			30G00302

Table VIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds			
SDG	**Compound**	**Concentration**	**Associated Samples**
WF054 cont.	Methylene chloride	8 ug/L	15T07601 15G00801 15G00801D 15G00802 15R03801 15G00803 15G00303
WF055	Volatiles	ND	-

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF022	**Client ID:** BKF01001		
	Laboratory ID: RB858010		
	Collection Date: 7/17/96		
	Type: Source blank		
	Volatiles		
	Acetone	4 ug/L	10U ug/L[1]
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBs	ND	None
WF022	**Client ID:** BKR01001		
	Laboratory ID: RB858002		
	Collection Date: 7/16/96		
	Type: Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	None
	Bis(2-ethylhexyl)phthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF022	**Client ID:** BKT01001		
	Laboratory ID: RB858001		
	Collection Date: 7/16/96		
	Type: Trip blank		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
WF022	**Client ID:** 17T01101		
	Laboratory ID: RB873001		
	Collection Date: 7/18/96		
	Type: Trip blank		
	Volatiles		
	Acetone	8 ug/L	10U ug/L[1]
WF023	**Client ID:** 01R01101		
	Laboratory ID: RB887005		
	Collection Date: 7/23/96		
	Type: Equipment rinsate		
	Volatiles		
	Acetone	4 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	6 ug/L	None
	Pesticides/PCBS	ND	None
WF023	**Client ID:** 01T01201		
	Laboratory ID: RB887001		
	Collection Date: 7/22/96		
	Type: Trip blank		
	Volatiles		
	Methylene chloride	2 ug/L	10U ug/L[1]
	Acetone	3 ug/L	10U ug/L[1]

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF023	**Client ID:**	**16T01301**		
	Laboratory ID:	**RB887014**		
	Collection Date:	**7/25/96**		
	Type:	**Trip blank**		
	<u>Volatiles</u>			
	Acetone		2 ug/L	None
WF024	**Client ID:**	**18T01401**		
	Laboratory ID:	**RB92001**		
	Collection Date:	**7/29/96**		
	Type:	**Trip blank**		
	<u>Volatiles</u>			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	10U ug/L[1]
	Chloroform		1 ug/L	None
WF024	**Client ID:**	**15R01201**		
	Laboratory ID:	**RB920005**		
	Collection Date:	**7/31/96**		
	Type:	**Equipment rinsate**		
	<u>Volatiles</u>			
	Acetone		6 ug/L	10U ug/L[1]
	<u>Semivolatiles</u>			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	**15R01301**		
	Laboratory ID:	**RB956011**		
	Collection Date:	**8/7/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	<u>Semivolatiles</u>			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None
WF025	**Client ID:**	**15T01501**		
	Laboratory ID:	**RB956001**		
	Collection Date:	**8/5/96**		
	Type:	**Trip blank**		
	<u>Volatiles</u>			
	Methylene chloride		2 ug/L	None
	Acetone		4 ug/L	None
WF025	**Client ID:**	**15T01601**		
	Laboratory ID:	**RB956012**		
	Collection Date:	**8/8/96**		
	Type:	**Trip blank**		
	<u>Volatiles</u>			
	Methylene chloride		1 ug/L	None
	Acetone		2 ug/L	10U ug/L

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF026	**Client ID:**	**15T01701**		
	Laboratory ID:	**RB980001**		
	Collection Date:	**8/12/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF026	**Client ID:**	**16T01801**		
	Laboratory ID:	**RB980015**		
	Collection Date:	**8/15/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		3 ug/L	10U ug/L[1]
WF026	**Client ID:**	**15R01401**		
	Laboratory ID:	**RB980012**		
	Collection Date:	**8/14/96**		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		6 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBS		ND	None
WF027	**Client ID:**	**16T01901**		
	Laboratory ID:	**RC016001**		
	Collection Date:	**8/19/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		5 ug/L	None
	Acetone		6 ug/L	None
WF027	**Client ID:**	**66T02001**		
	Laboratory ID:	**RC016014**		
	Collection Date:	**8/22/96**		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
WF027	**Client ID:**	**16R01501**		
	Laboratory ID:	**RC016012**		
	Collection Date:	**8/21/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Pesticides/PCBs		ND	None

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Summary of Field Blank Contamination
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NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF028	**Client ID:**	11T02201		
	Laboratory ID:	RC044008		
	Collection Date:	8/28/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		8 ug/L	10U ug/L[1]
WF028	**Client ID:**	10T02101		
	Laboratory ID:	RC044001		
	Collection Date:	8/26/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
WF028	**Client ID:**	11R01601		
	Laboratory ID:	RC044016		
	Collection Date:	8/28/96		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		9 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Pesticides/PCBs		ND	None
WF029	**Client ID:**	13R01701		
	Laboratory ID:	RC092008		
	Collection Date:	9/11/96		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		3 ug/L	10U ug/L[1]
	Semivolatiles			
	Di-n-butylphthalate		5 ug/L	None
	Bis(2-ethylhexyl)phthalate		1 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF029	**Client ID:**	13T02301		
	Laboratory ID:	RC092001		
	Collection Date:	9/9/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		2 ug/L	10U ug/L[1]
WF029	**Client ID:**	66T02401		
	Laboratory ID:	RC092011		
	Collection Date:	9/12/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Acetone		3 ug/L	10U ug/L[1]

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NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF030	**Client ID:**	66R01801		
	Laboratory ID:	RC121010		
	Collection Date:	9/18/96		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		4 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	None
	Bis(2-ethylhexyl)phthalate		1 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF030	**Client ID:**	66T02501		
	Laboratory ID:	RC121001		
	Collection Date:	9/16/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Acetone		3 ug/L	10U ug/L[1]
WF030	**Client ID:**	66T02601		
	Laboratory ID:	RC121012		
	Collection Date:	9/19/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Acetone		3 ug/L	None
WF031	**Client ID:**	05T02701		
	Laboratory ID:	MB928001		
	Collection Date:	9/23/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
WF031	**Client ID:**	33T02801		
	Laboratory ID:	MB958001		
	Collection Date:	9/26/96		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
WF031	**Client ID:**	05R01901		
	Laboratory ID:	MB928011		
	Collection Date:	9/25/96		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		2 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None

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Groundwater and Subsurface Soil Investigation, Phase IIB
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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF031B	**Client ID:**	16T04001		
	Laboratory ID:	MC447002		
	Collection Date:	11/21/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	06T02901		
	Laboratory ID:	MC011001		
	Collection Date:	9/30/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	29T03001		
	Laboratory ID:	MC037001		
	Collection Date:	10/3/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF032	**Client ID:**	06R02001		
	Laboratory ID:	MC011006		
	Collection Date:	10/2/96		
	Type:	Equipment rinsate		
	Volatiles		ND	None
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF033	**Client ID:**	29T03101		
	Laboratory ID:	MC085001		
	Collection Date:	10/7/96		
	Type:	Trip blank		
	Volatiles		ND	None
WF033	**Client ID:**	66T03201		
	Laboratory ID:	MC118001		
	Collection Date:	10/10/96		
	Type:	Trip blank		
	Volatiles			
	Acetone		26 ug/L	None
WF033	**Client ID:**	66R02101		
	Laboratory ID:	MC02101		
	Collection Date:	10/9/96		
	Type:	Equipment rinsate		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Semivolatiles			
	Di-n-butylphthalate		6 ug/L	None
	Pesticides/PCBs		ND	None

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Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF034	**Client ID:** 66T03301 **Laboratory ID:** MC153001 **Collection Date:** 10/14/96 **Type:** Trip blank		
	Volatiles	ND	None
WF034	**Client ID:** 66T03401 **Laboratory ID:** MC176001 **Collection Date:** 10/17/96 **Type:** Trip blank		
	Volatiles	ND	None
WF034	**Client ID:** 66R02201 **Laboratory ID:** MC153007 **Collection Date:** 10/16/96 **Type:** Equipment rinsate		
	Volatiles		
	Toluene	8 ug/L	None
	Ethylbenzene	1 ug/L	None
	Xylenes (total)	2 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	2 ug/L	None
	Pesticides/PCBs	ND	None
WF035	**Client ID:** 66T03501 **Laboratory ID:** MC214001 **Collection Date:** 10/21/96 **Type:** Trip blank		
	Volatiles	ND	None
WF035	**Client ID:** 66T03601 **Laboratory ID:** MC231001 **Collection Date:** 10/24/96 **Type:** Trip blank		
	Volatiles	ND	None
WF035	**Client ID:** 66R02301 **Laboratory ID:** MC214006 **Collection Date:** 10/23/96 **Type:** Equipment rinsate		
	Volatiles	ND	None
	Semivolatiles		
	Di-n-butylphthalate	3 ug/L	None
	Pesticides/PCBs	ND	None
WF036	**Client ID:** 66T03701 **Laboratory ID:** MC262001 **Collection Date:** 10/28/96 **Type:** Trip blank		
	Volatiles	ND	None

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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF036	**Client ID:**	**31T03801**		
	Laboratory ID:	**MC284001**		
	Collection Date:	**10/31/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF036	**Client ID:**	**54R02401**		
	Laboratory ID:	**MC262007**		
	Collection Date:	**10/30/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
	<u>Semivolatiles</u> Di-n-butylphthalate		4 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	ND
WF037	**Client ID:**	**15T03901**		
	Laboratory ID:	**MC424001**		
	Collection Date:	**11/18/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF037	**Client ID:**	**16T04001**		
	Laboratory ID:	**MC448004**		
	Collection Date:	**11/21/96**		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF037	**Client ID:**	**15R02501**		
	Laboratory ID:	**MC424009**		
	Collection Date:	**11/20/96**		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF037	**Client ID:**	**15F00201**		
	Laboratory ID:	**MC424010**		
	Collection Date:	**11/20/96**		
	Type:	**Source blank**		
	<u>Volatiles</u> Xylenes (total)		2 ug/L	None
	<u>Semivolatiles</u> Di-n-butylphthalate		4 ug/L	10U ug/L[1]
	Pesticides/PCBs		ND	None
WF038	**Client ID:**	**36RO2601**		
	Laboratory ID:	**MC687016**		
	Collection Date:	**12/18/96**		
	Type:	**Rinsate**		
	Volatiles		ND	None

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Summary of Field Blank Contamination
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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF038	**Client ID:**	36TO4101		
	Laboratory ID:	MC687001		
	Collection Date:	12/17/96		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF039	**Client ID:**	35TO4201		
	Laboratory ID:	MC698001		
	Collection Date:	12/19/97		
	Type:	**Trip Blank**		
	Volatiles		ND	None
WF039	**Client ID:**	35RO2701		
	Laboratory ID:	MC698011		
	Collection Date:	12/21/96		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF040	**Client ID:**	35TO4301		
	Laboratory ID:	MC783001		
	Collection Date:	1/7/97		
	Type:	**Trip blank**		
	Volatiles			
	Bromomethane		1 ug/L	10U ug/L[1]
WF040	**Client ID:**	37RO2801		
	Laboratory ID:	MC783017		
	Collection Date:	1/9/97		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		5 ug/L	10U ug/L[1]
	Carbon disulfide		2 ug/L	None
WF041	**Client ID:**	35T04501		
	Laboratory ID:	MD908001		
	Collection Date:	6/11/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		6 ug/L	None
WF041	**Client ID:**	37T04601		
	Laboratory ID:	MD926001		
	Collection Date:	6/12/97		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF041	**Client ID:**	35T04701		
	Laboratory ID:	MD950001		
	Collection Date:	6/15/97		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		3 ug/L	None
	Xylene (total)		1 ug/L	None

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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF041	**Client ID:**	13T04801		
	Laboratory ID:	MD985001		
	Collection Date:	6/16/97		
	Type:	**Trip blank**		
	Volatiles			
	Methylene chloride		2 ug/L	None
	Acetone		6 ug/L	None
WF041	**Client ID:**	35F00301		
	Laboratory ID:	MD908002		
	Collection Date:	6/11/97		
	Type:	**Source blank**		
	Semivolatiles			
	Di-n-butylphthalate		3 ug/L	None
	Pesticides & PCBs		**ND**	-
WF041	**Client ID:**	35R03001		
	Laboratory ID:	MD908003		
	Collection Date:	6/11/97		
	Type:	**Equipment rinsate**		
	Semivolatiles			
	Di-n-butylphthalate		4 ug/L	None
	Bis(2-ethylhexyl)phthalate		8 ug/L	None
	Pesticides & PCBs		ND	None
WF042	**Client ID:**	05T04901		
	Laboratory ID:	ME007001		
	Collection Date:	6/18/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF042	**Client ID:**	05T05001		
	Laboratory ID:	ME021001		
	Collection Date:	6/20/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		2 ug/L	None
WF042	**Client ID:**	05R03101		
	Laboratory ID:	ME007006		
	Collection Date:	6/17/97		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF043	**Client ID:**	05R03201		
	Laboratory ID:	ME042002		
	Collection Date:	6/23/97		
	Type:	**Equipment rinsate**		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None

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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF043	**Client ID:**	05T05101		
	Laboratory ID:	MW042001		
	Collection Date:	6/23/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF043	**Client ID:**	33T05201		
	Laboratory ID:	MW053001		
	Collection Date:	6/24/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		3 ug/L	None
WF043	**Client ID:**	33T05301		
	Laboratory ID:	ME073001		
	Collection Date:	6/25/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF043	**Client ID:**	30T05401		
	Laboratory ID:	ME087001		
	Collection Date:	6/26/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		4 ug/L	None
WF044	**Client ID:**	06R03301		
	Laboratory ID:	ME100002		
	Collection Date:	6/29/97		
	Type:	**Equipment rinsate**		
	Volatiles			
	Acetone		7 ug/L	None
	Trichloroethene		6 ug/L	None
	Toluene		3 ug/L	None
	Ethylbenzene		1 ug/L	None
	Xylene (total)		2 ug/L	None
WF044	**Client ID:**	06T05501		
	Laboratory ID:	ME100001		
	Collection Date:	6/29/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF044	**Client ID:**	66T05601		
	Laboratory ID:	ME110001		
	Collection Date:	6/30/97		
	Type:	**Trip blank**		
	Volatiles			
	Acetone		5 ug/L	10U ug/L[1]
WF044	**Client ID:**	66T05701		
	Laboratory ID:	ME133001		
	Collection Date:	7/2/97		
	Type:	**Trip blank**		
	Volatiles		ND	None

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Organic Compounds

SDG	Parameter	Concentration	Qualifier
WF044	**Client ID:** 66T05801 **Laboratory ID:** ME135001 **Collection Date:** 7/2/97 **Type:** Trip blank		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
WF045	**Client ID:** OWR03401 **Laboratory ID:** ME149002 **Collection Date:** 7/7/97 **Type:** Equipment rinsate		
	Volatiles		
	Acetone	3 ug/L	10U ug/L[1]
	1,2-Dichloropropane	1 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	5 ug/L	10U ug/L[1]
	Pesticides & PCBs	ND	None
WF045	**Client ID:** OWT05901 **Laboratory ID:** ME149001 **Collection Date:** 7/7/97 **Type:** Trip blank		
	Volatiles		
	Acetone	2 ug/L	10U ug/L[1]
WF045	**Client ID:** OWT06001 **Laboratory ID:** ME159001 **Collection Date:** 7/8/97 **Type:** Trip blank		
	Volatiles	ND	None
WF045	**Client ID:** 66T06101 **Laboratory ID:** ME175001 **Collection Date:** 7/9/97 **Type:** Trip blank		
	Volatiles		
	Acetone	2 ug/L	10U ug/L[1]
WF045	**Client ID:** OWT06201 **Laboratory ID:** ME190001 **Collection Date:** 7/10/97 **Type:** Trip blank		
	Volatiles	ND	None
WF045	**Client ID:** OWT06401 **Laboratory ID:** ME226001 **Collection Date:** 7/14/97 **Type:** Trip blank		
	Volatiles		
	Acetone	250 ug/L	None

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Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF045	**Client ID:** OWT06401DL **Laboratory ID:** ME226001DL **Collection Date:** 7/14/97 **Type:** Trip blank		
	Volatiles		
	Acetone	250 ug/L	None
WF046	**Client ID:** 31R03301 **Laboratory ID:** MW241002 **Collection Date:** 7/15/97 **Type:** Equipment rinsate		
	Volatiles		
	1,2-Dichloropropane	1 ug/L	None
	Semivolatiles		
	Di-n-butylphthalate	12 ug/L	12U ug/L[1]
	Pesticides & PCBs	ND	None
WF046	**Client ID:** 31T06501 **Laboratory ID:** ME241001 **Collection Date:** 7/15/97 **Type:** Trip blank		
	Volatiles		
	Acetone	4 ug/L	None
WF046	**Client ID:** 31T06601 **Laboratory ID:** ME261001 **Collection Date:** 7/16/97 **Type:** Trip blank		
	Volatiles		
	Toluene	1 ug/L	None
WF046	**Client ID:** 31T06701 **Laboratory ID:** ME305001 **Collection Date:** 7/21/97 **Type:** Trip blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
WF047	**Client ID:** STOR_BLK **Laboratory ID:** ME243008 **Collection Date:** 7/15/97 **Type:** Storage blank		
	Volatiles	ND	None
WF047	**Client ID:** STOR_BLK2 **Laboratory ID:** ME267008 **Collection Date:** 7/16/97 **Type:** Storage blank		
	Volatiles		
	Acetone	4 ug/L	None
	Toluene	0.4 ug/L	None

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Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF047	**Client ID:**	39T10001		
	Laboratory ID:	ME244001		
	Collection Date:	7/15/97		
	Type:	Trip blank		
	Volatiles			
	Carbon disulfide		0.40 ug/L	None
	Toluene		0.50 ug/L	None
WF048	**Client ID:**	39R03401		
	Laboratory ID:	ME264009		
	Collection Date:	7/17/97		
	Type:	Equipment rinsate		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None
WF049	**Client ID:**	39T10201		
	Laboratory ID:	ME262001		
	Collection Date:	7/15/97		
	Type:	Trip blank		
	Volatiles			
	Toluene		0.90 ug/L	None
WF049	**Client ID:**	39T10401		
	Laboratory ID:	ME263007		
	Collection Date:	7/17/97		
	Type:	Trip blank		
	Volatiles			
	Toluene		0.40 ug/L	None
WF051	**Client ID:**	16R03501		
	Laboratory ID:	ME306002		
	Collection Date:	7/21/97		
	Type:	Equipment rinsate		
	Volatiles			
	Methylene chloride		1 ug/L	None
WF051	**Client ID:**	16T06801		
	Laboratory ID:	ME306001		
	Collection Date:	7/21/97		
	Type:	Trip blank		
	Volatiles			
	Methylene chloride		1 ug/L	None
	Acetone		3 ug/L	None
WF051	**Client ID:**	16T06901		
	Laboratory ID:	ME322001		
	Collection Date:	7/22/97		
	Type:	Trip blank		
	Volatiles		ND	None
WF051	**Client ID:**	16T07001		
	Laboratory ID:	ME340001		
	Collection Date:	7/23/97		
	Type:	Trip blank		
	Volatiles		ND	None

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Organic Compounds			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF051	**Client ID:** 16T07101 **Laboratory ID:** ME348001 **Collection Date:** 7/25/97 **Type:** Trip blank		
	Volatiles	ND	None
WF052	**Client ID:** STORAGEBLK **Laboratory ID:** ME346008 **Collection Date:** 7/25/97 **Type:** Storage blank		
	Volatiles		
	Methylene chloride	1 ug/L	None
	Acetone	3 ug/L	None
WF052	**Client ID:** 39T10501 **Laboratory ID:** ME346007 **Collection Date:** 7/25/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15R03701 **Laboratory ID:** ME367002 **Collection Date:** 7/27/97 **Type:** Equipment rinsate		
	Volatiles	ND	None
WF053	**Client ID:** 15T07201 **Laboratory ID:** ME367001 **Collection Date:** 7/27/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07301 **Laboratory ID:** ME377001 **Collection Date:** 7/28/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07401 **Laboratory ID:** ME390001 **Collection Date:** 7/29/97 **Type:** Trip blank		
	Volatiles	ND	None
WF053	**Client ID:** 15T07501 **Laboratory ID:** ME404001 **Collection Date:** 7/30/97 **Type:** Trip blank		
	Volatiles	ND	None
WF054	**Client ID:** 15R03801 **Laboratory ID:** ME441005 **Collection Date:** 8/5/97 **Type:** Equipment rinsate		
	Volatiles	ND	None

Table IX
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Organic Compounds

SDG	Parameter		Concentration	Qualifier
WF054	**Client ID:**	30R03901		
	Laboratory ID:	ME450002		
	Collection Date:	8/6/97		
	Type:	**Equipment rinsate**		
	Volatiles			
	1,2-Dichloropropane		1 ug/L	None
WF054	**Client ID:**	15T07601		
	Laboratory ID:	ME441001		
	Collection Date:	8/4/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF054	**Client ID:**	30T07701		
	Laboratory ID:	ME450001		
	Collection Date:	8/5/97		
	Type:	**Trip blank**		
	Volatiles		ND	None
WF055	**Client ID:**	OWR04101		
	Laboratory ID:	MF004002		
	Collection Date:	10/27/97		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF055	**Client ID:**	13R04201		
	Laboratory ID:	MF004005		
	Collection Date:	10/28/97		
	Type:	**Equipment rinsate**		
	Volatiles		ND	None
WF055	**Client ID:**	OWT08001		
	Laboratory ID:	MF004001		
	Collection Date:	10/27/97		
	Type:	**Trip blank**		
	Volatiles		ND	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table X
Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF022	BKG00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF023	02G00301	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF024	15G00701	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF025	15G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF026	15G00803	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF027	16G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF028	12G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF029	14G00101	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF030	66G00601	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF031	05G01001	Iron	-	±100	-	-	124.8 ug/L	J
		Lead	-	±3.0	-	-	9.2 ug/L	J
		Sodium	-	±5000	-	-	5978 ug/L	J
		Zinc	-	±20.0	-	-	174 ug/L	J
		Cyanide	75-125	-	3.7	-	-	J (det) R (ND)
WF031B	None	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF032	29G00501	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None
WF033	66G00201	Metals	-	-	-	-	-	None
		Cyanide	-	-	-	-	-	None

Table X

Summary of Percent Recoveries (%R) and Relative Percent Differences (RPD) for Matrix Spike and Laboratory Duplicate Samples

Groundwater and Subsurface Soil Investigation, Phase IIB

NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Client ID	Analyte	Criteria		% Recovery		RPD/Difference	Qualifier
			% Recovery	Difference	MS	MSD		
WF034	30G00301	Antimony Cyanide	75-125 -	- -	126.7 -	- -	- -	J (all detects) None
WF035	66G01701	Metals Cyanide	- -	- -	- -	- -	- -	None None
WF036	54G00101	Metals Cyanide	- -	- -	- -	- -	- -	None None
WF037	15F00201	Metals Cyanide	- 75-125	- -	- 3.7	- -	- -	None J (det) R (ND)
WF041	35G00101	Aluminum Iron Manganese Cyanide	- - - -	≤100 ≤100 ≤10 -	- - - -	- - - -	402 ug/L 309 ug/L 75.2 ug/L -	J J J None
WF045	OWG00502	Metals Cyanide	- -	- -	- -	- -	- -	None None
WF046	31G00101	Metals Cyanide	- -	- -	- -	- -	- -	None None
WF047	39W034	Metals	-	-	-	-	-	None
WF051	None	Metals	-	-	-	-	-	None
WF053	15G00602	Metals	-	-	-	-	-	None
WF054	15G00801	Metals	-	-	-	-	-	None

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF022	**Client ID**	**BKG00101**	**BKG00101D**	
	Laboratory ID	**RB858003**	**RB858004**	
	Collection Date	**7/16/96**	**7/16/96**	
	Aluminum	43.4 ug/L	54.4 ug/L	22
	Barium	15.6 ug/L	15.6 ug/L	0
	Calcium	536 ug/L	558 ug/L	4
	Iron	54.0 ug/L	57.9 ug/L	7
	Lead	ND	0.80 ug/L	Not calculable
	Magnesium	499 ug/L	521 ug/L	4
	Manganese	1.7 ug/L	1.9 ug/L	11
	Selenium	0.67 ug/L	ND	Not calculable
	Sodium	1080 ug/L	1080 ug/L	0
	Zinc	2.4 ug/L	ND	Not calculable
	Cyanide	3.8 ug/L	6.5 ug/L	52
WF022	**Client ID**	**01G00102**	**01G00102D**	
	Laboratory ID	**RB873008**	**RB873009**	
	Collection Date	**7/19/96**	**7/19/96**	
	Aluminum	19.1 ug/L	10.3 ug/L	50
	Barium	15.6 ug/L	15.6 ug/L	0
	Beryllium	0.53 ug/L	ND	Not calculable
	Calcium	5850 ug/L	6250 ug/L	7
	Copper	ND	1.4 ug/L	Not calculable
	Iron	12.2 ug/L	8.8 ug/L	32
	Lead	1.3 ug/L	1.5 ug/L	14
	Magnesium	337 ug/L	331 ug/L	2
	Manganese	6.7 ug/L	9.0 ug/L	29
	Potassium	938 ug/L	842 ug/L	11
	Sodium	2100 ug/L	2070 ug/L	1
	Vanadium	ND	1.6 ug/L	Not calculable
	Zinc	10.2 ug/L	11.4 ug/L	11
	Cyanide	1.9 ug/L	ND	Not calculable
WF023	**Client ID**	**02G00301**	**02G00301D**	
	Laboratory ID	**RB887012**	**RB887013**	
	Collection Date	**7/24/96**	**7/24/96**	
	Aluminum	79.3 ug/L	84.6 ug/L	6
	Barium	128 ug/L	129 ug/L	0.8
	Beryllium	0.39 ug/L	ND	Not calculable
	Calcium	113000 ug/L	113000 ug/L	0
	Iron	36.2 ug/L	38.7 ug/L	7
	Lead	1.4 ug/L	1.3 ug/L	7
	Magnesium	9560 ug/L	9590 ug/L	0.3
	Manganese	13.5 ug/L	13.7 ug/L	1
	Nickel	7.8 ug/L	9.6 ug/L	21
	Potassium	4610 ug/L	4580 ug/L	0.7
	Selenium	1.2 ug/L	0.66 ug/L	58
	Sodium	2200 ug/L	2240 ug/L	2
	Vanadium	3.0 ug/L	2.8 ug/L	7
	Zinc	1.8 ug/L	2.0 ug/L	11
	Cyanide	4.5 ug/L	2.0 ug/L	77

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF024	**Client ID**	**15G00701**	**15G00701D**	
	Laboratory ID	**RB920009**	**RB950010**	
	Collection Date	**7/31/96**	**7/31/96**	
	Aluminum	161 ug/L	173 ug/L	7
	Barium	15.6 ug/L	19.3 ug/L	21
	Calcium	356 ug/L	360 ug/L	1
	Chromium	2.9 ug/L	2.0 ug/L	37
	Iron	183 ug/L	202 ug/L	10
	Lead	0.70 ug/L	0.60 ug/L	15
	Magnesium	433 ug/L	422 ug/L	3
	Manganese	2.8 ug/L	2.6 ug/L	7
	Sodium	1530 ug/L	1610 ug/L	5
	Vanadium	ND	1.2 ug/L	Not calculable
	Zinc	3.4 ug/L	3.6 ug/L	6
	Cyanide	2.6 ug/L	3.2 ug/L	21
WF025	**Client ID**	**15G00601**	**15G00601D**	
	Laboratory ID	**RB956006**	**RB956008**	
	Collection Date	**8/7/96**	**8/7/96**	
	Aluminum	89.4 ug/L	55.8 ug/L	46
	Arsenic	8.0 ug/L	7.8 ug/L	2
	Barium	67.6 ug/L	63.7 ug/L	6
	Calcium	3690 ug/L	3620 ug/L	2
	Iron	31000 ug/L	30500 ug/L	2
	Lead	0.90 ug/L	0.50U ug/L	Not calculable
	Magnesium	1940 ug/L	1900 ug/L	2
	Manganese	139 ug/L	136 ug/L	2
	Potassium	2460 ug/L	2340 ug/L	5
	Sodium	2630 ug/L	2590 ug/L	2
	Zinc	3.4 ug/L	3.3 ug/L	3
	Cyanide	1.5U ug/L	8.1 ug/L	Not calculable
WF026	**Client ID**	**15G00803**	**15G00803D**	
	Laboratory ID	**RB980007**	**RB980008**	
	Collection Date	**8/14/96**	**8/14/96**	
	Aluminum	187 ug/L	146 ug/L	25
	Barium	10.6 ug/L	10.8 ug/L	2
	Calcium	1440 ug/L	1170 ug/L	21
	Chromium	2.9 ug/L	2.0U ug/L	Not calculable
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Copper	4.0 ug/L	2.4 ug/L	50
	Iron	194 ug/L	175 ug/L	10
	Lead	0.80 ug/L	0.50 ug/L	46
	Magnesium	322 ug/L	296 ug/L	8
	Manganese	33.1 ug/L	32.9 ug/L	0.6
	Potassium	522 ug/L	316U ug/L	Not calculable
	Sodium	5350 ug/L	5380 ug/L	0.6
	Vanadium	2.0 ug/L	1.5 ug/L	29
	Zinc	176 ug/L	178 ug/L	1
	Cyanide	1.6 ug/L	4.2 ug/L	90

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF026	**Client ID**	**16G00403**	**16G00403D**	
	Laboratory ID	**RB980020**	**RB980021**	
	Collection Date	**8/16/96**	**8/16/96**	
	Aluminum	278 ug/L	290 ug/L	4
	Arsenic	1.0 ug/L	0.50U ug/L	Not calculable
	Barium	28.6 ug/L	27.5 ug/L	4
	Calcium	3110 ug/L	3300 ug/L	6
	Chromium	2.3 ug/L	2.9 ug/L	23
	Copper	1.1U ug/L	1.3 ug/L	Not calculable
	Iron	1370 ug/L	879 ug/L	44
	Lead	4.0 ug/L	2.7 ug/L	39
	Magnesium	1320 ug/L	987 ug/L	29
	Manganese	41.3 ug/L	33.5 ug/L	21
	Potassium	540 ug/L	713 ug/L	28
	Sodium	2570 ug/L	2590 ug/L	0.8
	Vanadium	2.2 ug/L	1.2U ug/L	Not calculable
	Zinc	103 ug/L	945 ug/L	161
	Cyanide	2.9 ug/L	1.6 ug/L	58
WF027	**Client ID**	**16G00501**	**16G00501D**	
	Laboratory ID	**RC016009**	**RC016013**	
	Collection Date	**8/21/96**	**8/21/96**	
	Aluminum	12.6 ug/L	16.7 ug/L	28
	Barium	10 ug/L	10 ug/L	0
	Calcium	239 ug/L	234 ug/L	2
	Cobalt	3.2 ug/L	2.3U ug/L	Not calculable
	Iron	9.2 ug/L	5.3 ug/L	54
	Magnesium	276 ug/L	261 ug/L	6
	Manganese	1.0U ug/L	2.1 ug/L	Not calculable
	Sodium	1550 ug/L	1450 ug/L	7
	Zinc	2.6 ug/L	1.6 ug/L	48
WF027	**Client ID**	**09G00301**	**09G00301D**	
	Laboratory ID	**RC016019**	**RC016020**	
	Collection Date	**8/23/96**	**8/23/96**	
	Aluminum	407 ug/L	372 ug/L	9
	Antimony	8.6U ug/L	9.3 ug/L	Not calculable
	Arsenic	2.6 ug/L	2.8 ug/L	7
	Barium	27.1 ug/L	25.8 ug/L	5
	Calcium	15300 ug/L	14600 ug/L	5
	Chromium	4.0 ug/L	2.4 ug/L	50
	Iron	173 ug/L	148 ug/L	16
	Lead	0.50U ug/L	0.60 ug/L	Not calculable
	Magnesium	158 ug/L	160 ug/L	1
	Manganese	1.5 ug/L	1.7 ug/L	12
	Potassium	2390 ug/L	2010 ug/L	17
	Sodium	2070 ug/L	1950 ug/L	6
	Vanadium	16.4 ug/L	14.3 ug/L	14
	Zinc	14.8 ug/L	1.2 ug/L	170

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF028	**Client ID**	**12G00101**	**12G00101D**	
	Laboratory ID	**RC044012**	**RC044017**	
	Collection Date	**8/27/96**	**8/27/96**	
	Aluminum	14.0 ug/L	15.1 ug/L	8
	Barium	14.5 ug/L	14.5 ug/L	0
	Calcium	1840 ug/L	1870 ug/L	2
	Lead	0.60 ug/L	0.50U ug/L	Not calculable
	Magnesium	320 ug/L	327 ug/L	2
	Manganese	1.0U ug/L	1.4 ug/L	Not calculable
	Potassium	2220 ug/L	2290 ug/L	3
	Sodium	2310 ug/L	2360 ug/L	2
	Thallium	0.70 ug/L	0.60U ug/L	Not calculable
	Zinc	6.7 ug/L	5.5 ug/L	20
	Cyanide	1.8U ug/L	2.1 ug/L	Not calculable
WF028	**Client ID**	**11G00201**	**11G00201D**	
	Laboratory ID	**RC044011**	**RC044018**	
	Collection Date	**8/28/96**	**8/28/96**	
	Aluminum	2770 ug/L	2320 ug/L	18
	Arsenic	1.7 ug/L	2.0 ug/L	16
	Barium	50.3 ug/L	51.6 ug/L	3
	Beryllium	0.40 ug/L	0.30U ug/L	Not calculable
	Calcium	35400 ug/L	41800 ug/L	17
	Chromium	20.4 ug/L	19.2 ug/L	6
	Copper	2.0 ug/L	3.1 ug/L	43
	Iron	232 ug/L	337 ug/L	37
	Lead	0.50U ug/L	0.90 ug/L	Not calculable
	Magnesium	388 ug/L	538 ug/L	32
	Manganese	2.2 ug/L	4.8 ug/L	74
	Potassium	12900 ug/L	9610 ug/L	29
	Sodium	3420 ug/L	2950 ug/L	15
	Vanadium	11.0 ug/L	11.0 ug/L	0
	Zinc	3.4 ug/L	24.3 ug/L	151
	Cyanide	1.5U ug/L	3.3 ug/L	Not calculable
WF029	**Client ID**	**14G00101**	**14G00101D**	
	Laboratory ID	**RC092007**	**RC092009**	
	Collection Date	**9/11/96**	**9/11/96**	
	Aluminum	33.1 ug/L	26.5 ug/L	22
	Arsenic	0.50 ug/L	0.50U ug/L	Not calculable
	Barium	22.3 ug/L	22.3 ug/L	0
	Calcium-	3060 ug/L	2870 ug/L	6
	Iron	22.0 ug/L	27.3 ug/L	22
	Lead	1.3 ug/L	0.80 ug/L	48
	Magnesium	702 ug/L	691 ug/L	2
	Manganese	1.9 ug/L	1.9 ug/L	0
	Mercury	0.12 ug/L	0.10U ug/L	Not calculable
	Sodium	1590 ug/L	1570 ug/L	1
	Vanadium	1.2U ug/L	1.4 ug/L	Not calculable
	Zinc	89.5 ug/L	96.8 ug/L	8

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF030	**Client ID**	**66G00601**	**66G00601D**	
	Laboratory ID	**RC121007**	**RC121011**	
	Collection Date	**9/18/96**	**9/18/96**	
	Aluminum	39.9 ug/L	39.7 ug/L	0.5
	Barium	38.1 ug/L	36.2 ug/L	5
	Calcium	863 ug/L	770 ug/L	11
	Copper	1.8 ug/L	1.1U ug/L	**Not calculable**
	Iron	8.2 ug/L	41.9 ug/L	134
	Lead	0.90 ug/L	0.50U ug/L	**Not calculable**
	Magnesium	1130 ug/L	1110 ug/L	2
	Manganese	5.0 ug/L	4.6 ug/L	8
	Potassium	860 ug/L	689 ug/L	22
	Selenium	0.64 ug/L	0.60U ug/L	**Not calculable**
	Sodium	1280 ug/L	1160 ug/L	10
	Zinc	2.9 ug/L	4.8 ug/L	49
WF030	**Client ID**	**66G02203**	**66G02203D**	
	Laboratory ID	**RC121016**	**RC121017**	
	Collection Date	**9/20/96**	**9/20/96**	
	Aluminum	44.0 ug/L	51.9 ug/L	16
	Barium	6.4 ug/L	6.4 ug/L	0
	Calcium	751 ug/L	731 ug/L	3
	Cobalt	2.3U ug/L	2.4 ug/L	Not calculable
	Iron	35.6 ug/L	38.9 ug/L	9
	Magnesium	271 ug/L	242 ug/L	11
	Manganese	9.7 ug/L	9.7 ug/L	0
	Potassium	491 ug/L	316U ug/L	Not calculable
	Sodium	2810 ug/L	2760 ug/L	2
	Zinc	1.2 ug/L	2.2 ug/L	59
	Cyanide	1.8U ug/L	12.0 ug/L	Not calculable
WF031	**Client ID**	**05G01001**	**05G01001D**	
	Laboratory ID	**MB928007**	**MB928012**	
	Collection Date	**9/25/96**	**9/25/96**	
	Barium	27.6 ug/L	27.1 ug/L	2
	Calcium	854 ug/L	803 ug/L	6
	Chromium	0.61 ug/L	0.36 ug/L	52
	Cobalt	0.85 ug/L	0.72 ug/L	17
	Copper	35.6 ug/L	1.7U ug/L	Not calculable
	Iron	40.1 ug/L	31.8U ug/L	Not calculable
	Lead	4.4 ug/L	1.8U ug/L	Not calculable
	Magnesium	874 ug/L	871 ug/L	0.6
	Manganese	3.3 ug/L	2.5 ug/L	28
	Mercury	0.03 ug/L	0.04 ug/L	29
	Nickel	1.4 ug/L	1.4 ug/L	0
	Potassium	3.1U ug/L	825 ug/L	Not calculable
	Selenium	5.4 ug/L	3.9U ug/L	Not calculable
	Sodium	15100 ug/L	14900 ug/L	1
	Thallium	7.4 ug/L	1.9U ug/L	Not calculable
	Vanadium	0.58U ug/L	0.63 ug/L	Not calculable
	Zinc	13.7 ug/L	3.8 ug/L	113

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF031	**Client ID**	**33G00301**	**33G00301D**	
	Laboratory ID	**MB958006**	**MB958007**	
	Collection Date	**9/27/96**	**9/27/96**	
	Aluminum	156	98.7	45
	Antimony	3.5	3.4U	Not calculable
	Barium	59.3	59.9	1
	Calcium	2230	2230	0
	Chromium	0.88	0.34U	Not calculable
	Cobalt	0.70	0.49	35
	Iron	107	50.6	72
	Magnesium	1750	1760	0.6
	Manganese	21.2	21.5	1
	Potassium	31.8	1040	188
	Sodium	5370	5550	3
	Thallium	2.9	3.4	16
	Vanadium	1.0	0.58U	Not calculable
	Zinc	7.4	7.2	3
WF032	**Client ID**	**29G00501**	**29G00501D**	
	Laboratory ID	**MC011007**	**MC011008**	
	Collection Date	**10/2/96**	**10/2/96**	
	Barium	89.7 ug/L	84.2 ug/L	6
	Beryllium	0.14 ug/L	0.19 ug/L	30
	Calcium	1580 ug/L	1470 ug/L	7
	Chromium	2.1 ug/L	2.8 ug/L	29
	Cobalt	0.94 ug/L	0.98 ug/L	4
	Copper	2.7 ug/L	4.4 ug/L	48
	Magnesium	2500 ug/L	2320 ug/L	7
	Manganese	8.4 ug/L	8.0 ug/L	5
	Mercury	0.04 ug/L	0.04 ug/L	0
	Sodium	5040 ug/L	5030 ug/L	0.2
	Zinc	5.1 ug/L	3.8 ug/L	29
	Cyanide	1.0 ug/L	1.2 ug/L	18
WF033	**Client ID**	**66G00201**	**66G00201D**	
	Laboratory ID	**MC118002**	**MC118003**	
	Collection Date	**10/9/96**	**10/9/96**	
	Barium	20.8 ug/L	20.7 ug/L	0.5
	Calcium	3250 ug/L	3100 ug/L	5
	Chromium	0.75 ug/L	0.44 ug/L	52
	Copper	1.7U ug/L	2.7 ug/L	Not calculable
	Iron	73.8 ug/L	31.8U ug/L	Not calculable
	Magnesium	456 ug/L	457 ug/L	0.2
	Manganese	3.4 ug/L	3.2 ug/L	6
	Mercury	0.03 ug/L	0.03 ug/L	0
	Potassium	648 ug/L	1920 ug/L	99
	Sodium	3040 ug/L	3020 ug/L	0.7
	Zinc	3.6 ug/L	6.0 ug/L	50

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF034	**Client ID**	**30G00301**	**30G00301D**	
	Laboratory ID	**MC153005**	**MC153008**	
	Collection Date	**10/16/96**	**10/16/96**	
	Barium	28.0 ug/L	27.8 ug/L	0.7
	Beryllium	0.20 ug/L	0.13U ug/L	Not calculable
	Calcium	1530 ug/L	1480 ug/L	3
	Copper	11.0 ug/L	3.2 ug/L	110
	Iron	626 ug/L	634 ug/L	1
	Lead	3.8 ug/L	2.4 ug/L	45
	Magnesium	642 ug/L	650 ug/L	1
	Manganese	20.7 ug/L	21.0 ug/L	1
	Mercury	0.04 ug/L	0.05 ug/L	22
	Potassium	1880 ug/L	2680 ug/L	35
	Sodium	4600 ug/L	4490 ug/L	2
	Zinc	5.5 ug/L	4.4 ug/L	22
WF035	**Client ID**	**66G01701**	**66G01701D**	
	Laboratory ID	**MC214005**	**MC214007**	
	Collection Date	**10/23/96**	**10/23/96**	
	Aluminum	24.3 ug/L	30.9 ug/L	24
	Barium	10.2 ug/L	10.7 ug/L	5
	Calcium	766 ug/L	816 ug/L	6
	Copper	1.7U ug/L	22.5 ug/L	Not calculable
	Iron	343 ug/L	348 ug/L	1
	Lead	2.0U ug/L	2.6 ug/L	Not calculable
	Magnesium	320 ug/L	324 ug/L	1
	Manganese	4.2 ug/L	5.4 ug/L	25
	Mercury	0.03 ug/L	0.03 ug/L	0
	Selenium	4.0 ug/L	3.9U ug/L	Not calculable
	Sodium	7660 ug/L	7790 ug/L	2
	Zinc	2.5 ug/L	26.3 ug/L	165
WF036	**Client ID**	**54G00101**	**54G00101D**	
	Laboratory ID	**MC262004**	**MC262008**	
	Collection Date	**10/30/96**	**10/30/96**	
	Aluminum	87.6 ug/L	91.6 ug/L	4
	Barium	75.2 ug/L	74.3 ug/L	1
	Beryllium	0.18 ug/L	0.18 ug/L	0
	Calcium	1680 ug/L	1660 ug/L	1
	Chromium	1.2 ug/L	1.0 ug/L	2
	Cobalt	0.90 ug/L	1.4 ug/L	43
	Magnesium	1950 ug/L	1920 ug/L	2
	Manganese	13.9 ug/L	12.9 ug/L	7
	Mercury	0.02 ug/L	0.01U ug/L	Not calculable
	Potassium	2410 ug/L	2530 ug/L	5
	Sodium	2110 ug/L	2070 ug/L	2
	Zinc	4.5 ug/L	3.5 ug/L	25

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF041	**Client ID**	**35G00101**	**35G00101D**	
	Laboratory ID	**MD908004**	**MD908005**	
	Collection Date	**6/11/97**	**6/11/97**	
	Aluminum	47.8 ug/L	45.2 ug/L	6
	Barium	78.8 ug/L	79.0 ug/L	0.2
	Calcium	3150 ug/L	3240 ug/L	3
	Copper	8.2 ug/L	6.8 ug/L	19
	Iron	15.9 ug/L	19.0 ug/L	18
	Lead	1.7 ug/L	0.93U ug/L	Not calculable
	Magnesium	2340 ug/L	2370 ug/L	1
	Manganese	28.7 ug/L	28.9 ug/L	0.7
	Sodium	4330 ug/L	4430 ug/L	2
	Thallium	1.9 ug/L	0.89U ug/L	Not calculable
	Zinc	12.1 ug/L	130 ug/L	166
	Cyanide	ND	ND	-
WF041	**Client ID**	**35G00202**	**35G00202D**	
	Laboratory ID	**MD950002**	**MD950003**	
	Collection Date	**6/15/97**	**6/15/97**	
	Aluminum	65.0 ug/L	50.7 ug/L	25
	Barium	24.8 ug/L	25.3 ug/L	2
	Calcium	973 ug/L	1030 ug/L	6
	Copper	5.6 ug/L	3.5 ug/L	46
	Iron	180 ug/L	196 ug/L	8
	Lead	0.93U ug/L	1.9 ug/L	Not calculable
	Magnesium	813 ug/L	819 ug/L	0.7
	Manganese	9.5 ug/L	9.3 ug/L	2
	Selenium	1.8U ug/L	2.6 ug/L	Not calculable
	Sodium	20900 ug/L	21700 ug/L	4
	Thallium	1.0 ug/L	0.89U ug/L	Not calculable
	Zinc	18.7 ug/L	15.4 ug/L	19
	Cyanide	ND	ND	-
WF045	**Client ID**	**OWG00502**	**OWG00502D**	
	Laboratory ID	**ME149004**	**ME149005**	
	Collection Date	**7/8/97**	**7/8/97**	
	Aluminum	175 ug/L	160 ug/L	9
	Barium	7.3 ug/L	7.1 ug/L	3
	Calcium	648 ug/L	585 ug/L	10
	Copper	2.9 ug/L	4.4 ug/L	41
	Iron	106 ug/L	97.1 ug/L	9
	Magnesium	308 ug/L	317 ug/L	3
	Manganese	3.3 ug/L	3.5 ug/L	6
	Nickel	7.8 ug/L	7.7U ug/L	Not calculable
	Sodium	1990 ug/L	2060 ug/L	3
	Zinc	4.5 ug/L	4.7 ug/L	4
	Cyanide	ND	ND	-

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF045	**Client ID**	**OWG00302**	**OWG00302D**	
	Laboratory ID	**ME190002**	**ME190003**	
	Collection Date	**7/10/97**	**7/10/97**	
	Aluminum	31.5 ug/L	16.6U ug/L	Not calculable
	Barium	10.2 ug/L	10.5 ug/L	3
	Calcium	460 ug/L	454 ug/L	1
	Iron	83.3 ug/L	51.1 ug/L	48
	Lead	1.9 ug/L	1.2U ug/L	Not calculable
	Magnesium	286 ug/L	300 ug/L	5
	Manganese	3.0 ug/L	3.0 ug/L	0
	Sodium	1670 ug/L	1670 ug/L	0
	Zinc	3.4 ug/L	3.8 ug/L	11
	Cyanide	ND	ND	-
WF046	**Client ID**	**31G00101**	**31G00101D**	
	Laboratory ID	**ME241003**	**ME241004**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	96.0 ug/L	91.1 ug/L	5
	Barium	22.6 ug/L	22.5 ug/L	0.4
	Calcium	857 ug/L	851 ug/L	0.7
	Copper	1.3U ug/L	1.4 ug/L	Not calculable
	Iron	120 ug/L	103 ug/L	15
	Magnesium	662 ug/L	675 ug/L	2
	Manganese	9.7 ug/L	9.9 ug/L	2
	Potassium	1910 ug/L	2200 ug/L	15
	Sodium	1760 ug/L	1890 ug/L	7
	Vanadium	1.8 ug/L	1.7U ug/L	Not calculable
	Zinc	3.5 ug/L	9.8 ug/L	95
	Cyanide	ND	ND	-
WF047	**Client ID**	**39W034**	**39W034D**	
	Laboratory ID	**ME243005**	**ME243006**	
	Collection Date	**7/15/97**	**7/15/97**	
	Aluminum	94.0 ug/L	76.3 ug/L	21
	Barium	22.9 ug/L	22.8 ug/L	0.4
	Calcium	1030 ug/L	1010 ug/L	2
	Copper	8.2 ug/L	1.3U ug/L	Not calculable
	Iron	747 ug/L	751 ug/L	0.5
	Magnesium	871 ug/L	854 ug/L	2
	Manganese	12.5 ug/L	12.6 ug/L	0.8
	Sodium	2210 ug/L	2090 ug/L	6
	Zinc	14.7 ug/L	3.0 ug/L	132
WF051	**Client ID**	**16G00101**	**16G00101D**	
	Laboratory ID	**ME340009**	**ME340010**	
	Collection Date	**7/24/97**	**7/24/97**	
	Barium	20.5 ug/L	20.7 ug/L	1
	Calcium	514 ug/L	520 ug/L	1
	Copper	1.7 ug/L	1.7 ug/L	0
	Iron	11.2 ug/L	14.7 ug/L	27
	Magnesium	617 ug/L	623 ug/L	1
	Manganese	3.2 ug/L	3.0 ug/L	6
	Sodium	2130 ug/L	2110 ug/L	1
	Zinc	3.2 ug/L	8.2 ug/L	88

Table XI
Summary of Relative Percent Differences (RPD) for Original and Field Duplicate Samples
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

SDG	Inorganic Analytes			RPD
WF053	**Client ID**	**15G00602**	**15G00602D**	
	Laboratory ID	**ME367004**	**ME367005**	
	Collection Date	**7/27/97**	**7/27/97**	
	Aluminum	16.6U ug/L	29.9 ug/L	Not calculable
	Barium	13.0 ug/L	13.0 ug/L	0
	Calcium	676 ug/L	675 ug/L	0.1
	Chromium	3.3 ug/L	4.2 ug/L	24
	Iron	33.8 ug/L	92.6 ug/L	93
	Magnesium	504 ug/L	490 ug/L	3
	Manganese	2.3 ug/L	2.7 ug/L	16
	Sodium	2870 ug/L	2740 ug/L	5
	Zinc	3.1 ug/L	3.4 ug/L	9
WF053	**Client ID**	**15G00703**	**15G00703D**	
	Laboratory ID	**ME404003**	**ME404004**	
	Collection Date	**7/30/97**	**7/30/97**	
	Aluminum	43.6 ug/L	108 ug/L	14
	Antimony	17.3U ug/L	21.2 ug/L	Not calculable
	Barium	6.6 ug/L	6.2 ug/L	6
	Calcium	587 ug/L	549 ug/L	7
	Chromium	10.6 ug/L	13.4 ug/L	23
	Copper	2.9 ug/L	4.5 ug/L	43
	Iron	107 ug/L	115 ug/L	7
	Lead	0.93U ug/L	5.1 ug/L	Not calculable
	Magnesium	280 ug/L	266 ug/L	5
	Manganese	6.9 ug/L	6.5 ug/L	6
	Nickel	10.9 ug/L	20.3 ug/L	60
	Sodium	2040 ug/L	1820 ug/L	11
	Zinc	5.2 ug/L	6.1 ug/L	16
WF054	**Client ID**	**15G00801**	**15G00801D**	
	Laboratory ID	**ME441002**	**ME441003**	
	Collection Date	**8/4/97**	**8/4/97**	
	Aluminum	143 ug/L	116 ug/L	21
	Arsenic	2.0 ug/L	1.1U ug/L	Not calculable
	Barium	34.7 ug/L	37.3 ug/L	7
	Calcium	1870 ug/L	2010 ug/L	7
	Copper	5.2 ug/L	2.6 ug/L	67
	Iron	4760 ug/L	4940 ug/L	4
	Magnesium	1370 ug/L	1470 ug/L	7
	Manganese	84.6 ug/L	91.4 ug/L	8
	Mercury	0.04U ug/L	0.07 ug/L	Not calculable
	Sodium	1830 ug/L	1960 ug/L	7
	Thallium	0.89U ug/L	0.90 ug/L	Not calculable
	Zinc	8.5 ug/L	6.6 ug/L	25

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF022	All	Metals Cyanide	- -	- -	None None
WF023	All	Metals Cyanide	- -	- -	None None
WF024	All	Metals Cyanide	- -	- -	None None
WF025	All	Metals Cyanide	- -	- -	None None
WF026	All	Metals Cyanide	- -	- -	None None
WF027	All	Metals Cyanide	- -	- -	None None
WF028	All	Metals Cyanide	- -	- -	None None
WF029	All	Metals Cyanide	- -	- -	None None
WF030	All	Metals Cyanide	- -	- -	None None
WF031	All	Metals Cyanide	- -	- -	None None
WF031B	All	Metals Cyanide	- -	- -	None None
WF032	All	Metals Cyanide	- -	- -	None None
WF033	All	Metals Cyanide	- -	- -	None None
WF034	All	Metals Cyanide	- -	- -	None None
WF035	All	Metals Cyanide	- -	- -	None None
WF036	All	Metals Cyanide	- -	- -	None None
WF037	All	Metals Cyanide	- -	- -	None None
WF041	All	Metals Cyanide	- -	- -	None None
WF045	All	Metals Cyanide	- -	- -	None None
WF046	All	Metals Cyanide	- -	- -	None None
WF047	All	Metals	-	-	None
WF051	All	Metals	-	-	None

Table XII
Summary of Analytes Exceeding Instrument Calibration
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Date	Analyte	Initial Calibration r	Continuing Calibration %R	Qualifier
WF053	All	Metals	-	-	None
WF054	All	Metals	-	-	None

Notes: r = correlation coefficient for initial calibrations

%R = percent recovery for continuing calibrations

J = the analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample because QC criteria were not met (validation "J").

UJ = the analyte was not detected above the reported sample IDL. However, the reported sample is approximate; the analyte concentration may not reliably be presumed to be less than the IDL value.

R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria. The presence or absence of the analyte cannot be verified.

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF022	Aluminum Iron Lead Sodium Zinc	6.240 ug/L 12.320 ug/L 0.500 ug/L 38.890 ug/L 3.660 ug/L	All samples in SDG WF022
WF023	Arsenic Iron Lead Sodium Zinc	-0.500 ug/L 5.980 ug/L 1.200 ug/L 34.400 ug/L 1.200 ug/L	All samples in SDG WF023
WF024	Aluminum Iron Lead Sodium	10.600 ug/L 13.190 ug/L 0.500 ug/L 37.550 ug/L	All samples in SDG WF024
WF025	Aluminum Beryllium Iron Selenium Zinc	13.650 ug/L -0.320 ug/L 7.390 ug/L 0.650 ug/L 1.610 ug/L	All samples in SDG WF025
WF026	Aluminum Calcium Iron Magnesium Mercury Sodium Zinc	17.380 ug/L 119.520 ug/L 10.050 ug/L 22.940 ug/L 0.140 ug/L 41.280 ug/L 2.510 ug/L	All samples in SDG WF026
	Mercury	0.20 ug/L	All samples in SDG WF026
WF027	Aluminum Antimony Arsenic Calcium Sodium Vanadium	18.000 ug/L 9.280 ug/L 0.500 ug/L 94.550 ug/L 28.990 ug/L 1.280 ug/L	All samples in SDG WF027
	Mercury	0.21 ug/L	All samples in SDG WF027
WF028	Aluminum Antimony Calcium Magnesium Mercury Potassium Sodium Zinc	51.600 ug/L -10.930 ug/L 113.470 ug/L 45.540 ug/L 0.140 ug/L 498.120 ug/L 43.870 ug/L 1.230 ug/L	All samples in SDG WF028

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF029	Aluminum Barium Cobalt Iron Vanadium	10.6 ug/L 3.0 ug/L 2.7 ug/L 21.4 ug/L 1.4 ug/L	All samples in SDG WF029
	Cobalt Vanadium	2.7 ug/L 1.6 ug/L	All samples in SDG WF029
	Mercury	-0.1 ug/L	All samples in SDG WF029
	Iron Vanadium	5.3 ug/L 1.6 ug/L	All samples in SDG WF029
	Calcium Cobalt Iron Sodium Zinc	153.810 ug/L 2.390 ug/L 11.590 ug/L 37.260 ug/L 1.630 ug/L	All samples in SDG WF029
WF030	Calcium Iron Sodium	59.580 ug/L 6.080 ug/L 54.620 ug/L	All samples in SDG WF030
WF031	Mercury Potassium Silver Thallium	0.030 ug/L -617.8 ug/L -1.2 ug/L 3.3 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.047 ug/L 34.4 ug/L -1.6 ug/L 3.7 ug/L	All samples in SDG WF031
	Mercury Potassium Silver	0.055 ug/L 542.9 ug/L -1.4 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.070 ug/L -21.4 ug/L -1.3 ug/L 3.5 ug/L	All samples in SDG WF031
	Mercury Potassium	0.047 ug/L -411.210 ug/L	All samples in SDG WF031
	Mercury Potassium Silver Thallium	0.085 ug/L 955.8 ug/L -2.5 ug/L 3.2 ug/L	All samples in SDG WF031
	Mercury	0.127 ug/L	All samples in SDG WF031
	Mercury	0.130 ug/L	All samples in SDG WF031
	Mercury Potassium Silver	-0.030 ug/L -335.53 ug/L -1.420 ug/L	All samples in SDG WF031

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF031 cont.	Arsenic	-6.4 ug/L	All samples in SDG WF031
	Chromium	-0.4 ug/L	
	Mercury	0.034 ug/L	
	Potassium	171.0 ug/L	
	Thallium	5.1 ug/L	
	Vanadium	1.4 ug/L	
	Mercury	0.016 ug/L	All samples in SDG WF031
	Potassium	342.4 ug/L	
	Silver	-1.2 ug/L	
	Thallium	5.2 ug/L	
	Vanadium	0.8 ug/L	
	Chromium	-0.7 ug/L	All samples in SDG WF031
	Mercury	0.011 ug/L	
	Potassium	308.7 ug/L	
	Thallium	6.2 ug/L	
	Vanadium	0.7 ug/L	
	Barium	-0.2 ug/L	All samples in SDG WF031
	Chromium	-0.6 ug/L	
	Mercury	-0.021 ug/L	
	Potassium	377.6 ug/L	
	Thallium	7.2 ug/L	
	Mercury	0.014 ug/L	All samples in SDG WF031
	Arsenic	-6.7 ug/L	All samples in SDG WF031
	Barium	-0.2 ug/L	
	Chromium	-0.8 ug/L	
	Mercury	-0.032 ug/L	
	Nickel	-1.4 ug/L	
	Potassium	441.5 ug/L	
	Thallium	5.7 ug/L	
	Vanadium	0.6 ug/L	
WF031B	Copper	604 ug/L	All samples in SDG WF031B
	Aluminum	-19.5 ug/L	All samples in SDG WF031B
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Manganese	0.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF031B
	Copper	6.6 ug/L	
	Iron	3.5 ug/L	
	Mercury	0.0 ug/L	
	Nickel	9.5 ug/L	
	Sodium	10.6 ug/L	
	Barium	25.130 ug/L	All samples in SDG WF031B
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF032	Copper Manganese Mercury Potassium	4.5 ug/L 0.5 ug/L 0.0242 ug/L -1595.8 ug/L	All samples in SDG WF032
	Beryllium Cobalt Copper Manganese Mercury Sodium	0.2 ug/L 0.3 ug/L 5.5 ug/L 0.7 ug/L 0.0265 ug/L 17.3 ug/L	All samples in SDG WF032
	Beryllium Copper Manganese Mercury Potassium Sodium	0.2 ug/L 4.9 ug/L 0.6 ug/L 0.0255 ug/L 1914.8 ug/L 11.6 ug/L	All samples in SDG WF032
	Beryllium Copper Manganese Mercury Sodium	0.2 ug/L 5.6 ug/L 0.6 ug/L -0.0178 ug/L 17.4 ug/L	All samples in SDG WF032
	Barium Chromium Copper Manganese Mercury Sodium Zinc	1.210 ug/L 2.750 ug/L 3.390 ug/L 0.410 ug/L 0.015 ug/L 856.490 ug/L 2.310 ug/L	All samples in SDG WF032
	Barium Beryllium Cobalt Copper Manganese	0.3 ug/L 0.1 ug/L 0.4 ug/L 5.8 ug/L 0.2 ug/L	All samples in SDG WF032
	Barium Beryllium Copper Manganese Mercury Nickel Sodium	0.3 ug/L 0.1 ug/L 5.8 ug/L 0.4 ug/L -0.0874 ug/L 2.0 ug/L 11.5 ug/L	All samples in SDG WF032
	Barium Beryllium Copper Manganese Thallium	0.2 ug/L 0.1 ug/L 5.6 ug/L 0.5 ug/L 2.6 ug/L	All samples in SDG WF032
	Barium Beryllium Cobalt Copper Manganese Nickel Thallium	0.3 ug/L 0.3 ug/L 0.6 ug/L 7.0 ug/L 0.8 ug/L 1.4 ug/L 4.3 ug/L	All samples in SDG WF032

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

	Inorganic Analytes		
SDG	**Analyte**	**Concentration**	**Associated Samples**
WF032 cont.	Aluminum	107.660 ug/L	All samples in SDG WF032
	Antimony	4.320 ug/L	
	Barium	1.760 ug/L	
	Cadmium	1.660 ug/L	
	Calcium	105.840 ug/L	
	Cobalt	0.430 ug/L	
	Copper	12.450 ug/L	
	Iron	54.350 ug/L	
	Magnesium	103.090 ug/L	
	Manganese	0.280 ug/L	
	Sodium	154.770 ug/L	
	Zinc	9.120 ug/L	
	Antimony	4.3 ug/L	All samples in SDG WF032
	Barium	0.4 ug/L	
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Sodium	10.2 ug/L	All samples in SDG WF032
WF033	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Cobalt	0.4 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.2 ug/L	
	Mercury	0.07 ug/L	
	Potassium	-1595.8 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.8 ug/L	
	Manganese	0.4 ug/L	
	Mercury	0.04 ug/L	
	Potassium	655.4 ug/L	
	Barium	0.2 ug/L	All samples in SDG WF033
	Beryllium	0.1 ug/L	
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.05 ug/L	
	Potassium	1914.8 ug/L	
	Thallium	2.6 ug/L	
	Barium	0.3 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Cobalt	0.6 ug/L	
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Potassium	425.8 ug/L	
	Thallium	4.3 ug/L	
	Aluminum	164.460 ug/L	All samples in SDG WF033
	Barium	1.220 ug/L	
	Calcium	107.040 ug/L	
	Copper	2.900 ug/L	
	Iron	33.430 ug/L	
	Magnesium	82.790 ug/L	
	Manganese	0.330 ug/L	
	Potassium	1602.780 ug/L	
	Sodium	221.450 ug/L	
	Zinc	1.660 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Mercury	0.06 ug/L	All samples in SDG WF033
	Barium	0.4 ug/L	All samples in SDG WF033
	Beryllium	0.3 ug/L	
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.05 ug/L	
	Potassium	163.8 ug/L	
	Antimony	4.810 ug/L	All samples in SDG WF033
	Barium	0.460 ug/L	
	Copper	2.870 ug/L	
	Manganese	0.330 ug/L	
	Potassium	509.990 ug/L	
	Sodium	137.200 ug/L	
	Zinc	3.200 ug/L	
	Barium	0.8 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.0 ug/L	
	Potassium	1734.0 ug/L	
	Thallium	2.4 ug/L	
	Vanadium	1.1 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.9 ug/L	
	Chromium	1.2 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.3 ug/L	
	Potassium	1605.5 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.8 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF033
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Potassium	768.8 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Potassium	314.6 ug/L	
	Vanadium	1.2 ug/L	

Table XIII
Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF033 cont.	Barium	1.0 ug/L	All samples in SDG WF033
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	684.9 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF033
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Potassium	722.1 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF034	Copper	5.8 ug/L	All samples in SDG WF034
	Mercury	0.023 ug/L	
	Copper	5.8 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Mercury	0.017 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Copper	5.6 ug/L	
	Manganese	0.5 ug/L	
	Mercury	0.030 ug/L	
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	7.0 ug/L	
	Manganese	0.8 ug/L	
	Mercury	0.042 ug/L	
	Sodium	10.2 ug/L	
	Barium	0.460 ug/L	66G02001
	Copper	2.870 ug/L	66G00302
	Sodium	137.200 ug/L	66G01801
	Zinc	3.200 ug/L	30G00301
	Cyanide	-1.327 ug/L	30G00401
			66R02201
			30G00301D
	Mercury	0.024 ug/L	All samples in SDG WF034
	Beryllium	0.3 ug/L	All samples in SDG WF034
	Copper	5.2 ug/L	
	Manganese	0.6 ug/L	
	Mercury	0.026 ug/L	
	Mercury	0.040 ug/L	All samples in SDG WF034
	Mercury	0.033 ug/L	All samples in SDG WF034

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Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF034 cont.	Arsenic	-13.610 ug/L	66G01101
	Barium	1.700 ug/L	66G01301
	Beryllium	-0.710 ug/L	66G00501
	Calcium	108.610 ug/L	66G00501F
	Copper	1.700 ug/L	
	Lead	-8.620 ug/L	
	Manganese	0.790 ug/L	
	Selenium	10.810 ug/L	
	Sodium	70.400 ug/L	
	Zinc	3.200 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Silver	3.3 ug/L	
	Sodium	11.9 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Silver	2.2 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF034
	Copper	1.9 ug/L	
	Manganese	0.6 ug/L	
	Sodium	20.0 ug/L	
	Beryllium	0.1 ug/L	All samples in SDG WF034
	Silver	2.6 ug/L	
	Sodium	17.3 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF034
	Manganese	0.4 ug/L	
	Sodium	9.7 ug/L	
WF035	Barium	0.8 ug/L	All samples in SDG WF035
	Beryllium	0.6 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0239 ug/L	
	Thallium	2.4 ug/L	
	Barium	1.2 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.3 ug/L	
	Mercury	0.0256 ug/L	
	Thallium	3.4 ug/L	
	Barium	1.1 ug/L	All samples in SDG WF035
	Beryllium	0.8 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0401 ug/L	
	Thallium	3.2 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF035
	Beryllium	0.7 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.334 ug/L	
	Aluminum	101.120 ug/L	All samples in SDG WF035
	Barium	0.410 ug/L	
	Iron	56.400 ug/L	
	Manganese	0.430 ug/L	
	Sodium	152.450 ug/L	
	Zinc	2.190 ug/L	

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF035 cont.	Barium Beryllium Manganese Mercury Thallium	1.0 ug/L 0.6 ug/L 1.0 ug/L 0.0250 ug/L 2.2 ug/L	All samples in SDG WF035
	Barium Beryllium Manganese Thallium	0.9 ug/L 0.7 ug/L 1.0 ug/L 3.4 ug/L	All samples in SDG WF035
	Barium Beryllium Calcium Copper Manganese Zinc	0.570 ug/L -0.910 ug/L 109.820 ug/L 5.470 ug/L 0.720 ug/L 4.400 ug/L	All samples in SDG WF035
	Manganese	0.6 ug/L	All samples in SDG WF035
	Manganese	0.4 ug/L	All samples in SDG WF035
	Barium Beryllium Manganese	0.4 ug/L -0.2 ug/L 0.6 ug/L	All samples in SDG WF035
	Beryllium Manganese	-0.2 ug/L 0.6 ug/L	All samples in SDG WF035
	Beryllium Manganese	-0.2 ug/L 0.4 ug/L	All samples in SDG WF035
WF036	Aluminum Barium Beryllium Cadmium Chromium Cobalt Manganese Mercury Thallium Vanadium	17.7 ug/L 0.8 ug/L 0.6 ug/L 0.8 ug/L 0.9 ug/L 1.1 ug/L 1.0 ug/L 0.0265 ug/L 2.4 ug/L 1.1 ug/L	All samples in SDG WF036
	Aluminum Barium Beryllium Cadmium Chromium Cobalt Manganese Mercury Thallium Vanadium	18.4 ug/L 1.2 ug/L 0.8 ug/L 0.9 ug/L 1.2 ug/L 1.1 ug/L 1.3 ug/L 0.0251 ug/L 3.4 ug/L 1.8 ug/L	All samples in SDG WF036

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF036 cont.	Aluminum	14.7 ug/L	All samples in SDG WF036
	Barium	1.1 ug/L	
	Beryllium	0.8 ug/L	
	Cadmium	0.8 ug/L	
	Chromium	1.1 ug/L	
	Cobalt	1.1 ug/L	
	Manganese	1.2 ug/L	
	Mercury	0.0165 ug/L	
	Thallium	3.2 ug/L	
	Vanadium	1.7 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF036
	Beryllium	0.7 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	0.8 ug/L	
	Manganese	1.0 ug/L	
	Mercury	0.0157 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	63.950 ug/L	All samples in SDG WF036
	Barium	0.730 ug/L	
	Chromium	0.490 ug/L	
	Manganese	0.430 ug/L	
	Mercury	0.014 ug/L	
	Potassium	1817.440 ug/L	
	Cyanide	-1.333 ug/L	
	Barium	1.0 ug/L	All samples in SDG WF036
	Beryllium	0.6 ug/L	
	Cadmium	0.6 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	2.2 ug/L	
	Vanadium	1.2 ug/L	
	Aluminum	91.5 ug/L	All samples in SDG WF036
	Barium	0.9 ug/L	
	Beryllium	0.7 ug/L	
	Cadmium	0.7 ug/L	
	Chromium	0.9 ug/L	
	Cobalt	1.0 ug/L	
	Manganese	1.0 ug/L	
	Thallium	3.4 ug/L	
	Vanadium	1.2 ug/L	
WF037	Copper	6.4 ug/L	All samples in SDG WF037
	Aluminum	-19.5 ug/L	All samples in SDG WF037
	Barium	0.4 ug/L	
	Copper	4.4 ug/L	
	Barium	0.4 ug/L	All samples in SDG WF037
	Copper	6.6 ug/L	

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Summary of Method Blank Contamination
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NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF037 cont.	Barium	25.130 ug/L	All samples in SDG WF037
	Beryllium	-0.830 ug/L	
	Calcium	129.890 ug/L	
	Copper	8.310 ug/L	
	Iron	8.680 ug/L	
	Magnesium	25.430 ug/L	
	Manganese	0.490 ug/L	
	Silver	2.970 ug/L	
	Sodium	84.450 ug/L	
	Vanadium	2.060 ug/L	
	Zinc	3.100 ug/L	
	Cyanide	-0.981 ug/L	
WF041	Cyanide	-0.6 ug/L	All samples in SDG WF041
	Barium	0.5 ug/L	All samples in SDG WF041
	Sodium	12.2 ug/L	All samples in SDG WF041
	Cyanide	-0.4 ug/L	
	Barium	0.7 ug/L	All samples in SDG WF041
	Sodium	16.3 ug/L	
	Beryllium	-1.010 ug/L	All samples in SDG WF041
	Calcium	133.200 ug/L	
	Copper	3.740 ug/L	
	Iron	9.490 ug/L	
	Lead	1.260 ug/L	
	Sodium	93.470 ug/L	
	Thallium	1.310 ug/L	
	Zinc	19.070 ug/L	
	Cyanide	-1.002 ug/L	
	Barium	-0.6 ug/L	All samples in SDG WF041
	Chromium	-2.9 ug/L	
	Copper	-1.7 ug/L	
	Magnesium	-22.9 ug/L	
	Silver	-2.8 ug/L	
	Vanadium	-3.0 ug/L	
	Copper	6.4 ug/L	All samples in SDG WF041
	Thallium	1.4 ug/L	
	Vanadium	-1.9 ug/L	
	Cobalt	8.9 ug/L	All samples in SDG WF041
	Thallium	1.6 ug/L	
	Cyanide	-0.4 ug/L	
	Beryllium	-0.830 ug/L	All samples in SDG WF041
	Calcium	105.800 ug/L	
	Iron	3.860 ug/L	
	Selenium	-3.230 ug/L	
	Sodium	15.150 ug/L	
	Vanadium	-2.240 ug/L	
	Zinc	0.940 ug/L	
	Selenium	-3.4 ug/L	All samples in SDG WF041
	Thallium	-1.3 ug/L	
	Lead	1.2 ug/L	All samples in SDG WF041
	Selenium	-2.6 ug/L	
	Cyanide	-0.4 ug/L	

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF041 cont.	Selenium Thallium	-3.1 ug/L 1.3 ug/L	All samples in SDG WF041
	Selenium Cyanide	-2.8 ug/L -0.5 ug/L	All samples in SDG WF041
	Thallium Cyanide	-1.0 ug/L -0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
	Cyanide	0.4 ug/L	All samples in SDG WF041
WF045	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Manganese	0.4 ug/L	All samples in SDG WF045
	Vanadium	1.8 ug/L	All samples in SDG WF045
	Beryllium Calcium Iron Sodium Vanadium Zinc Cyanide	-0.860 ug/L 136.80 ug/L 5.390 ug/L 32.780 ug/L -1.730 ug/L 3.340 ug/L -1.013 ug/L	All samples in SDG WF045
	Mercury	0.1 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Thallium Cyanide	1.1 ug/L -0.6 ug/L	All samples in SDG WF045
	Cyanide	-0.6 ug/L	All samples in SDG WF045
	Aluminum Barium Beryllium Calcium Iron Sodium Thallium Zinc Cyanide	17.320 ug/L 0.450 ug/L -0.550 ug/L 121.820 ug/L 6.770 ug/L 45.700 ug/L -1.390 ug/L 2.510 ug/L -0.899 ug/L	All samples in SDG WF045
	Beryllium Manganese Sodium	0.2 ug/L 0.5 ug/L 17.2 ug/L	OWG00401 OWG00201
	Beryllium Manganese Sodium Zinc	0.2 ug/L 0.7 ug/L 12.2 ug/L 1.0 ug/L	OWG00401 OWG00201

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Summary of Method Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF045 cont.	Barium	0.9 ug/L	OWG00401
	Beryllium	0.5 ug/L	OWG00201
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.2 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	
	Cyanide	-0.377 ug/L	OWG00401
			OWG00201
	Beryllium	0.2 ug/L	OWG00401
	Sodium	11.0 ug/L	OWG00201
	Selenium	-2.2 ug/L	OWG00401
			OWG00201
	Thallium	-1.0 ug/L	OWG00401
			OWG00201
WF046	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Mercury	0.040 ug/L	
	Sodium	12.2 ug/L	
	Beryllium	0.5 ug/L	All samples in SDG WF046
	Mercury	0.043 ug/L	
	Sodium	19.9 ug/L	
	Aluminum	17.320 ug/L	All samples in SDG WF046
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Boron	-0.377 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF046
	Sodium	11.0 ug/L	
WF047	Beryllium	0.2 ug/L	All samples in SDG WF047
	Manganese	0.5 ug/L	
	Mercury	0.1 ug/L	
	Sodium	17.2 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Manganese	0.7 ug/L	
	Sodium	12.2 ug/L	
	Zinc	1.0 ug/L	
	Barium	0.9 ug/L	All samples in SDG WF047
	Beryllium	0.5 ug/L	
	Chromium	3.0 ug/L	
	Manganese	1.0 ug/L	
	Sodium	19.9 ug/L	
	Thallium	1.1 ug/L	
	Vanadium	2.0 ug/L	
	Zinc	1.6 ug/L	

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NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF047 cont.	Aluminum	17.320 ug/L	All samples in SDG WF047
	Barium	0.450 ug/L	
	Beryllium	-0.550 ug/L	
	Calcium	121.820 ug/L	
	Iron	6.770 ug/L	
	Sodium	45.700 ug/L	
	Thallium	-1.390 ug/L	
	Zinc	2.510 ug/L	
	Beryllium	0.2 ug/L	All samples in SDG WF047
	Sodium	11.0 ug/L	
	Selenium	-2.2 ug/L	All samples in SDG WF047
WF051	Barium	1.0 ug/L	All samples in SDG WF051
	Beryllium	0.2 ug/L	
	Chromium	3.4 ug/L	
	Copper	1.5 ug/L	
	Manganese	0.5 ug/L	
	Silver	2.8 ug/L	
	Vanadium	2.4 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Vanadium	1.8 ug/L	
	Arsenic	1.1 ug/L	All samples in SDG WF051
	Mercury	0.04 ug/L	
	Selenium	-1.9 ug/L	
	Manganese	-0.5 ug/L	All samples in SDG WF051
	Mercury	0.07 ug/L	
	Beryllium	-0.800 ug/L	All samples in SDG WF051
	Calcium	140.860 ug/L	
	Iron	5.470 ug/L	
	Sodium	36.740 ug/L	
	Zinc	1.980 ug/L	
	Mercury	0.08 ug/L	All samples in SDG WF051
	Silver	-2.4 ug/L	
	Aluminum	16.800 ug/L	All samples in SDG WF051
	Barium	0.600 ug/L	
	Beryllium	-0.680 ug/L	
	Calcium	127.440 ug/L	
	Chromium	3.050 ug/L	
	Cobalt	2.850 ug/L	
	Copper	2.120 ug/L	
	Iron	10.740 ug/L	
	Manganese	0.690 ug/L	
	Silver	3.040 ug/L	
	Sodium	54.160 ug/L	
	Vanadium	2.700 ug/L	
	Zinc	2.710 ug/L	
	Calcium	42.0 ug/L	All samples in SDG WF051

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Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF051 cont.	Barium Beryllium Cobalt Copper Manganese Zinc	0.6 ug/L 0.4 ug/L 2.6 ug/L 1.7 ug/L 0.9 ug/L 1.2 ug/L	All samples in SDG WF051
	Manganese	0.7 ug/L	All samples in SDG WF051
	Arsenic Beryllium Calcium Iron Zinc	-1.130 ug/L -0.720 ug/L 131.080 ug/L 12.060 ug/L 4.540 ug/L	All samples in SDG WF051
	Lead	-1.3 ug/L	All samples in SDG WF051
	Lead Magnesium	-1.4 ug/L 0.5 ug/L	All samples in SDG WF051
	Lead	-1.6 ug/L	All samples in SDG WF051
	Aluminum Barium Beryllium Calcium Chromium Iron Manganese Sodium Zinc	18.640 ug/L 0.490 ug/L -0.760 ug/L 134.210 ug/L 3.850 ug/L 35.410 ug/L 0.500 ug/L 35.200 ug/L 2.300 ug/L	All samples in SDG WF051
	Lead Vanadium	-2.0 ug/L 2.0 ug/L	All samples in SDG WF051
	Barium Beryllium Lead Manganese Sodium	0.9 ug/L 0.3 ug/L -2.0 ug/L 0.7 ug/L 9.2 ug/L	All samples in SDG WF051
	Sodium	15.0 ug/L	All samples in SDG WF051
	Arsenic	-1.6 ug/L	All samples in SDG WF051
WF053	Aluminum Barium Beryllium Calcium Chromium Iron Manganese Sodium Zinc	18.640 ug/L 0.490 ug/L -0.760 ug/L 134.210 ug/L 3.850 ug/L 35.410 ug/L 0.500 ug/L 35.200 ug/L 2.330 ug/L	All samples in SDG WF053

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Inorganic Analytes

SDG	Analyte	Concentration	Associated Samples
WF053 cont.	Barium	-0.760 ug/L	All samples in SDG WF053
	Calcium	138.650 ug/L	
	Chromium	3.750 ug/L	
	Copper	3.390 ug/L	
	Iron	14.500 ug/L	
	Manganese	0.490 ug/L	
	Nickel	8.370 ug/L	
	Sodium	42.790 ug/L	
	Zinc	2.940 ug/L	
	Aluminum	26.970 ug/L	All samples in SDG WF053
	Beryllium	-0.710 ug/L	
	Calcium	151.990 ug/L	
	Iron	16.430 ug/L	
	Manganese	0.580 ug/L	
	Silver	4.360 ug/L	
	Sodium	52.750 ug/L	
	Zinc	3.720 ug/L	
	Beryllium	-0.970 ug/L	All samples in SDG WF053
	Calcium	130.780 ug/L	
	Copper	1.480 ug/L	
	Iron	19.510 ug/L	
	Lead	-1.380 ug/L	
	Manganese	0.780 ug/L	
	Sodium	13.170 ug/L	
	Zinc	6.090 ug/L	
	Aluminum	52.990 ug/L	All samples in SDG WF053
	Arsenic	1.300 ug/L	
	Beryllium	-0.940 ug/L	
	Calcium	198.990 ug/L	
	Chromium	6.790 ug/L	
	Copper	2.230 ug/L	
	Iron	38.980 ug/L	
	Lead	-1.460 ug/L	
	Manganese	1.000 ug/L	
	Sodium	60.080 ug/L	
	Zinc	2.040 ug/L	
WF054	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Mercury	0.1 ug/L	All samples in SDG WF054
	Beryllium	-0.980 ug/L	All samples in SDG WF054
	Calcium	110.890 ug/L	
	Iron	9.300 ug/L	
	Mercury	0.052 ug/L	
	Vanadium	-2.660 ug/L	
	Zinc	2.260 ug/L	

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF022	**Client ID:**	BKR01001		
	Laboratory ID:	RB858002		
	Collection Date:	7/16/96		
	Type:	**Equipment rinsate**		
	Sodium		43.4 ug/L	None
	Aluminum		55.9 ug/L	23.9U ug/L[1]
	Calcium		69.0 ug/L	None
	Iron		23.9 ug/L	43.4U ug/L[1]
	Magnesium		39.7 ug/L	None
	Mercury		0.10 ug/L	None
	Zinc		1.2 ug/L	1.2U ug/L[1]
WF022	**Client ID:**	BKF01001		
	Laboratory ID:	RB858010		
	Collection Date:	7/17/96		
	Type:	**Source blank**		
	Sodium		61.3 ug/L	61.3U ug/L[1]
WF023	**Client ID:**	01R01101		
	Laboratory ID:	RB887005		
	Collection Date:	7/23/96		
	Type:	**Equipment rinsate**		
	Aluminum		13.3 ug/L	None
	Iron		10.8 ug/L	10.8U ug/L[1]
	Zinc		1.2 ug/L	1.2U ug/L[1]
	Cyanide		2.6 ug/L	None
WF024	**Client ID:**	15R01201		
	Laboratory ID:	RB920005		
	Collection Date:	7/31/96		
	Type:	**Equipment rinsate**		
	Aluminum		13.8 ug/L	13.8U ug/L[1]
	Iron		10.5 ug/L	10.5U ug/L[1]
	Sodium		55.4 ug/L	55.4U ug/L[1]
	Cyanide		2.6 ug/L	None
WF025	**Client ID:**	15R01301		
	Laboratory ID:	RB956011		
	Collection Date:	8/7/96		
	Type:	**Equipment rinsate**		
	Iron		5.3 ug/L	5.3U ug/L[1]
	Sodium		26.6 ug/L	None
	Zinc		1.8 ug/L	1.8U ug/L[1]
WF026	**Client ID:**	15R01401		
	Laboratory ID:	RB980012		
	Collection Date:	8/14/96		
	Type:	**Equipment rinsate**		
	Iron		14.8 ug/L	14.8U ug/L[1]
	Zinc		1.1 ug/L	1.1U ug/L[1]
	Cyanide		1.8 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF027	**Client ID:**	16R01501		
	Laboratory ID:	RC016012		
	Collection Date:	8/21/96		
	Type:	**Equipment rinsate**		
	Arsenic		0.50 ug/L	0.50U ug/L[1]
	Calcium		64.0 ug/L	64.0U ug/L[1]
	Lead		0.80 ug/L	None
	Sodium		26.9 ug/L	26.9U ug/L[1]
	Zinc		1.8 ug/L	None
WF028	**Client ID:**	11R01601		
	Laboratory ID:	RC044016		
	Collection Date:	8/28/96		
	Type:	**Equipment rinsate**		
	Calcium		67.2 ug/L	67.2U ug/L[1]
	Sodium		30.8 ug/L	30.8U ug/L[1]
	Cyanide		1.5 ug/L	None
WF029	**Client ID:**	13R01701		
	Laboratory ID:	RC092008		
	Collection Date:	9/11/96		
	Type:	**Equipment rinsate**		
	Calcium		66.4 ug/L	66.4U ug/L[1]
	Sodium		25.4 ug/L	25.4U ug/L[1]
	Zinc		1.8 ug/L	1.8U ug/L[1]
WF030	**Client ID:**	66R01801		
	Laboratory ID:	RC121010		
	Collection Date:	9/18/96		
	Type:	**Equipment rinsate**		
	Calcium		55.7 ug/L	55.7U ug/L[1]
	Iron		9.2 ug/L	9.2U ug/L[1]
	Selenium		0.68 ug/L	None
	Sodium		24.9 ug/L	24.9U ug/L[1]
	Zinc		2.0 ug/L	None
WF031	**Client ID:**	05R01901		
	Laboratory ID:	MB928011		
	Collection Date:	9/25/96		
	Type:	**Equipment rinsate**		
	Barium		0.34 ug/L	None
	Manganese		0.38 ug/L	None
	Mercury		0.06 ug/L	0.06U ug/L[1]
	Zinc		2.0 ug/L	None
WF032	**Client ID:**	06R02001		
	Laboratory ID:	MC011006		
	Collection Date:	10/2/96		
	Type:	**Equipment rinsate**		
	Barium		2.8 ug/L	2.8U ug/L[1]
	Chromium		2.5 ug/L	2.5U ug/L[1]
	Copper		2.9 ug/L	2.9U ug/L[1]
	Manganese		0.48 ug/L	0.48U ug/L[1]
	Mercury		0.01 ug/L	0.01U ug/L[1]
	Sodium		365 ug/L	None
	Zinc		3.0 ug/L	3.0U ug/L[1]
	Cyanide		1.4 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes			
SDG	**Parameter**	**Concentration**	**Qualifier**
WF033	**Client ID:** 66R02101		
	Laboratory ID: MC085007		
	Collection Date: 10/9/96		
	Type: Equipment rinsate		
	Barium	1.6 ug/L	1.6U ug/L[1]
	Beryllium	0.32 ug/L	0.32U ug/L[1]
	Chromium	0.55 ug/L	0.55U ug/L[1]
	Cobalt	0.84 ug/L	0.84U ug/L[1]
	Manganese	2.4 ug/L	2.4U ug/L[1]
	Potassium	777 ug/L	777U ug/L[1]
	Sodium	334 ug/L	334U ug/L[1]
	Vanadium	0.63 ug/L	0.63U ug/L[1]
	Zinc	1.4 ug/L	1.4U ug/L[1]
WF034	**Client ID:** 66R0201		
	Laboratory ID: MC153007		
	Collection Date: 10/16/96		
	Type: Equipment rinsate		
	Barium	0.56 ug/L	0.56 ug/L[1]
	Manganese	0.44 ug/L	0.44 ug/L[1]
	Mercury	0.02 ug/L	0.02 ug/L[1]
	Sodium	119 ug/L	119 ug/L[1]
	Zinc	2.2 ug/L	2.2 ug/L[1]
WF035	**Client ID:** 66R02301		
	Laboratory ID: MC214006		
	Collection Date: 10/23/96		
	Type: Equipment rinsate		
	Aluminum	30.7 ug/L	30.7 ug/L[1]
	Barium	1.3 ug/L	1.3 ug/L[1]
	Calcium	101 ug/L	101 ug/L[1]
	Manganese	0.94 ug/L	0.94 ug/L[1]
	Mercury	0.03 ug/L	0.03 ug/L[1]
	Sodium	100 ug/L	100 ug/L[1]
	Zinc	2.4 ug/L	2.4 ug/L[1]
WF036	**Client ID:** 54R02401		
	Laboratory ID: MC262007		
	Collection Date: 10/30/96		
	Type: Equipment rinsate		
	Aluminum	14.8 ug/L	14.8 ug/L[1]
	Barium	0.59 ug/L	0.59 ug/L[1]
	Chromium	0.48 ug/L	0.48 ug/L[1]
	Manganese	0.32 ug/L	0.32 ug/L[1]
	Potassium	756 ug/L	756 ug/L[1]
	Sodium	265 ug/L	None
	Zinc	1.4 ug/L	None
WF037	**Client ID:** 15F00201		
	Laboratory ID: MC424010		
	Collection Date: 12/2/96		
	Type: Source blank		
	Barium	1.2 ug/L	None
	Calcium	111 ug/L	None
	Copper	6.8 ug/L	None
	Manganese	0.43 ug/L	None
	Sodium	95.7 ug/L	None
	Zinc	2.6 ug/L	None

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF041	**Client ID:**	35F00301		
	Laboratory ID:	MD908002		
	Collection Date:	6/11/97		
	Type:	**Source blank**		
	Barium		0.78 ug/L	None
	Calcium		164 ug/L	164U ug/L[1]
	Copper		10.3 ug/L	10.3U ug/L[1]
	Iron		35.6 ug/L	35.6U ug/L[1]
	Lead		1.0 ug/L	1.0U ug/L[1]
	Manganese		0.88 ug/L	None
	Sodium		129 ug/L	129U ug/L[1]
	Zinc		13.3 ug/L	13.3U ug/L[1]
WF041	**Client ID:**	35R03001		
	Laboratory ID:	MD908003		
	Collection Date:	6/11/97		
	Type:	**Equipment rinsate**		
	Barium		1.0 ug/L	None
	Calcium		165 ug/L	165U ug/L[1]
	Copper		4.9 ug/L	4.9U ug/L[1]
	Iron		10.7 ug/L	10.7U ug/L[1]
	Manganese		1.2 ug/L	None
	Sodium		148 ug/L	148U ug/L[1]
	Thallium		1.7 ug/L	1.7U ug/L[1]
	Zinc		15.8 ug/L	15.8U ug/L[1]
WF045	**Client ID:**	OWR03401		
	Laboratory ID:	ME149002		
	Collection Date:	7/7/97		
	Type:	**Equipment rinsate**		
	Barium		0.44 ug/L	0.44U ug/L[1]
	Calcium		133 ug/L	133U ug/L[1]
	Copper		1.8 ug/L	None
	Iron		7.1 ug/L	7.1U ug/L[1]
	Sodium		60.4 ug/L	60.4U ug/L[1]
	Zinc		1.7 ug/L	1.7U ug/L[1]
WF046	**Client ID:**	31R03301		
	Laboratory ID:	MW241002		
	Collection Date:	7/15/97		
	Type:	**Equipment rinsate**		
	Barium		1.1 ug/L	1.1U ug/L[1]
	Calcium		126 ug/L	126U ug/L[1]
	Iron		4.4 ug/L	4.4U ug/L[1]
	Manganese		0.40 ug/L	None
	Sodium		65.6 ug/L	65.6U ug/L[1]
	Zinc		5.4 ug/L	5.4U ug/L[1]

Table XIV
Summary of Field Blank Contamination
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton Florida

Inorganic Analytes

SDG	Parameter		Concentration	Qualifier
WF051	**Client ID:**	**16R03601**		
	Laboratory ID:	**ME340005**		
	Collection Date:	**7/23/97**		
	Type:	**Equipment rinsate**		
	Calcium		166 ug/L	166U ug/L[1]
	Copper		1.7 ug/L	1.7U ug/L[1]
	Iron		12.7 ug/L	12.7U ug/L[1]
	Lead		1.2 ug/L	None
	Manganese		0.68 ug/L	0.68U ug/L[1]
	Sodium		48.9 ug/L	48.9U ug/L[1]
	Zinc		2.6 ug/L	2.6U ug/L[1]
WF053	**Client ID:**	**15R03701**		
	Laboratory ID:	**ME367002**		
	Collection Date:	**7/27/97**		
	Type:	**Equipment rinsate**		
	Barium		1.6 ug/L	None
	Calcium		134 ug/L	134U ug/L[1]
	Chromium		4.2 ug/L	4.2U ug/L[1]
	Copper		2.1 ug/L	2.1U ug/L[1]
	Iron		18.4 ug/L	None
	Manganese		0.69 ug/L	0.69U ug/L[1]
	Sodium		83.0 ug/L	83.0U ug/L[1]
	Zinc		5.0 ug/L	5.0U ug/L[1]
WF054	**Client ID:**	**15R03801**		
	Laboratory ID:	**ME441005**		
	Collection Date:	**8/5/97**		
	Type:	**Equipment rinsate**		
	Cadmium		4.7 ug/L	
	Calcium		159 ug/L	159U ug/L[1]
	Copper		1.3 ug/L	None
	Iron		13.3 ug/L	13.3U ug/L[1]
	Manganese		0.48 ug/L	None
	Mercury		0.05 ug/L	0.05U ug/L[1]
	Sodium		20.0 ug/L	None
	Zinc		1.8 ug/L	None
WF054	**Client ID:**	**30R03901**		
	Laboratory ID:	**ME450002**		
	Collection Date:	**8/6/97**		
	Type:	**Equipment rinsate**		
	Aluminum		16.7 ug/L	None
	Barium		0.78 ug/L	None
	Calcium		150 ug/L	150U ug/L
	Copper		3.7 ug/L	None
	Iron		14.0 ug/L	14.0U ug/L
	Manganese		0.58 ug/L	None
	Sodium		67.0 ug/L	None
	Zinc		4.4 ug/L	None

[1] = sample result was modified based on an associated method blank concentration.

Note: see detailed data validation report for the discrete qualifiers.

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF022	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF023	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF024	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF025	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF026	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF027	Volatiles	Acceptable	Acceptable	Acceptable	99.0	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF028	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF029	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF030	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF031	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	0	Acceptable
WF031B	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF032	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	99.3	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF033	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF034	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF035	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF036	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF037	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides/PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	**Unacceptable**	Acceptable	**0**	Acceptable
WF038	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF039	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF040	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF041	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF042	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF043	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF044	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF045	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	**Unacceptable**	**Unacceptable**	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF046	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Pesticides & PCBs	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
	Cyanide	Acceptable	Acceptable	Acceptable	100	Acceptable
WF047	Volatiles	Acceptable	Acceptable	Acceptable	97.0	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF048	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF049	Volatiles	Acceptable	Acceptable	Acceptable	95.2	Acceptable
	Semivolatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
WF051	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF052	Volatiles	Acceptable	Acceptable	Acceptable	94.3	Acceptable

Table XV
Sample Event PARCC Summary
Groundwater and Subsurface Soil Investigation, Phase IIB
NAS Whiting Field, Milton, Florida

SDG	Fraction	Precision[1]	Accuracy[2]	Representativeness	Completeness (%)	Comparability
WF053	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF054	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable
	Metals	Acceptable	Acceptable	Acceptable	100	Acceptable
WF055	Volatiles	Acceptable	Acceptable	Acceptable	100	Acceptable

[1]Cumulative of sampling and analytical components.
[2]Analytical component.
[3]Samples results rejected for database purposes were not used in the completeness calculation.

Notes: All completeness is expressed as the ratio of number of sample results considered usable (i.e., not qualified as rejected) to the total number of sample results.

% = percent

APPENDIX C

HUMAN HEALTH RISK DATA

Table C-1
Screening Concentrations for Surface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Goal Leaching Value[2]	Selected Screening Concentration[3]
Volatile Organic Compounds (μg/kg)				
1,2,4-Trichlorobenzene	78,000	560,000	NA	78,000
1,4-Dichlorobenzene	27,000	5,600	NA	5,600
2-Hexanone	310,000	650,000	NA	310,000
Xylenes (total)	16,000,000	290,000	NA	290,000
Semivolatile Organic Compounds (μg/kg)				
Acenaphthene	470,000	2,300,000	NA	470,000
Anthracene	2,300,000	19,000,000	NA	2,300,000
Benzo(a)anthracene	870	1,400	NA	870
Benzo(a)pyrene	87	100	NA	87
Benzo(b)fluoranthene	870	1,400	NA	870
Benzo(g,h,i)perylene	[4]230,000	2,300,000	NA	230,000
Benzo(k)fluoranthene	8,700	15,000	NA	8,700
Butlybenzylphthalate	1,600,000	220,000	NA	220,000
Carbazole	32,000	53,000	NA	32,000
Chrysene	87,000	140,000	NA	87,000
Dibenzo(a,h)anthracene	87	100	NA	87
Dibenzofuran	31,000	270,000	NA	31,000
Diethylphthalate	6,300,000	640,000	NA	640,000
Fluoranthene	310,000	2,800,000	NA	310,000
Fluorene	310,000	2,100,000	NA	310,000
Indeno(1,2,3-cd)pyrene	870	1,500	NA	870
Phenanthrene	[4]230,000	1,900,000	NA	230,000
Pyrene	230,000	2,200,000	NA	230,000
bis(2-Ethylhexyl)phthalate	46,000	75,000	NA	46,000
Pesticides/PCBs (μg/kg)				
4,4'-DDD	2,700	4,500	NA	2,700
4,4'-DDE	1,900	3,200	NA	1,900
4,4'-DDT	1,900	3,200	NA	1,900
Aroclor-1254	[5]320	[5]600	NA	320
Aroclor-1260	[5]320	[5]600	NA	320

See notes at end of table.

Table C-1 (Continued)
Screening Concentrations for Surface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Goal Leaching Value[2]	Selected Screening Concentration[3]
Pesticides/PCBs (μg/kg)--continued				
Dieldrin	40	70	NA	40
Heptachlor	140	10	NA	10
Heptachlor epoxide	70	100	NA	70
alpha-Chlordane	[6]1,800	[6]3,000	NA	1,800
gamma-Chlordane	[6]1,800	[6]3,000	NA	1,800
Inorganic Analytes (mg/kg)				
Aluminum	7,800	72,000	SPLP	7,800
Antimony	3.1	26	NA	3.1
Arsenic	[7]0.43	[7]0.8	NA	0.43
Barium	550	105	NA	105
Beryllium	16	120	NA	16
Cadmium	3.9	37	NA	3.9
Calcium	[8]1,000,000	NSC	NA	1,000,000
Chromium	[9]23	[9]290	NA	23
Cobalt	470	4,700	NA	470
Copper	310	105	NA	105
Cyanide	[10]160	1,600	NA	160
Iron	2,300	23,000	NA	2,300
Lead	[11]400	500	NA	400
Magnesium	[8]460,468	NSC	NA	460,468
Manganese	160	1,600	NA	160
Mercury	2.3	3.7	NA	2.3
Nickel	160	105	NA	105
Potassium	[8]1,000,000	NSC	NA	1,000,000
Selenium	39	390	NA	39
Sodium	[8]1,000,000	NSC	NA	1,000,000
Thallium	[12]0.63	NSC	NA	0.63
Vanadium	55	15	NA	15
Zinc	2,300	23,000	NA	2,300

See notes at end of table.

Table C-1 (Continued)
Screening Concentrations for Surface Soil
for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Goal Leaching Value[2]	Selected Screening Concentration[3]
Other (μg/kg)				
Total petroleum hydrocarbons	NSC	350	NA	350

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risk-Based Concentration (RBC) Table for residential soil (October 22, 1997) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998.
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Target Level.
[4] Pyrene used as a surrogate.
[5] Screening value PCBs are used.
[6] Values for Chlordane used as surrogate.
[7] Value is based on arsenic's as a carcinogen.
[8] Essential nutrient screening value (see the General Information Report).
[9] RBC and Florida Cleanup Goal values are based on Chromium VI.
[10] RBC value is based on hydrogen cyanide.
[11] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).
[12] Value is for thallium sulfate.

Notes: μg/kg = micrograms per kilogram.
NA = not applicable.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyl dichloroethane.
DDE = dichlorodiphenyl dichloroethylene.
DDT = dichlorodiphenyl trichloroethane.
mg/kg = milligrams per kilogram.
SPLP = synthetic precipitation leaching procedure; leachability values may be derived using the SPLP test to calculate site-specific soil cleanup target levels.

Table C-2
Screening Concentrations for Subsurface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Goal Leaching Value[2]	Selected Screening Concentration[3]
Volatile Organic Compounds (μg/kg)				
2-Butanone	120,000,000	35,000,000	NA	15,000,000
Carbon disulfide	20,000,000	730,000	NA	34,000
Ethylbenzene	20,000,000	240,000	NA	10,000,000
Toluene	41,000,000	520,000	NA	3,500,000
Xylenes (total)	410,000,000	290,000	NA	92,000,000
Semivolatile Organic Compounds (μg/kg)				
2-Methylnaphthalene	[4]4,100,000	15,000,000	NA	8,200,000
Acenaphthene	12,000,000	22,000,000	NA	12,000,000
Dibenzofuran	820,000	4,400,000	NA	820,000
Fluoranthene	8,200,000	45,000,000	NA	8,200,000
Fluorene	8,200,000	24,000,000	NA	8,200,000
Naphthalene	4,100,000	8,500,000	NA	8,200,000
Phenanthrene	[5]6,100,000	29,000,000	NA	6,100,000
Pyrene	6,100,000	40,000,000	NA	6,100,000
Pesticides/PCBs (μg/kg)				
4,4'-DDD	24,000	17,000	NA	17,000
4,4'-DDE	17,000	12,000	NA	11,000
4,4'-DDT	17,000	13,000	NA	12,000
Aldrin	340	200	NA	200
Dieldrin	360	300	NA	300
Inorganic Analytes (mg/kg)				
Aluminum	200,000	1,000,000	NA	100,000
Antimony	82	240	NA	82
Arsenic	[6]3.8	[6]3.7	NA	3.7
Barium	14,000	87,000	NA	14,000
Beryllium	410	700	NA	1.0
Cadmium	100	1,300	NA	100
Calcium	[7]1,000,000	NSC	NA	1,000,000
Chromium	[8]610	[8]430	NA	430
Cobalt	12,000	110,000	NA	12,000
Copper	8,200	12,000	NA	8,200
Cyanide	[9]4,100	5,000	NA	4,100
Iron	61,000	490,000	NA	61,000
Lead	[10]400	920	NA	400

See notes at end of table.

Table C-2 (Continued)
Screening Concentrations for Subsurface Soil for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Analyte	Risk Based Screening Concentration[1]	Florida Cleanup Target Level[2]	Florida Cleanup Goal Leaching Value[2]	Selected Screening Concentration[3]
Inorganic Analytes (mg/kg)--continued				
Magnesium	[7]460,468	NSC	NA	460,468
Manganese	4,100	20,000	NA	4,700
Mercury	61	28	NA	61
Nickel	4,100	28,000	NA	4,100
Potassium	[7]1,000,000	NSC	NA	1,000,000
Selenium	1000	10,000	NA	1,000
Silver	1000	9,100	NA	1,000
Sodium	[7]1,000,000	NSC	NA	1,000,000
Vanadium	1,400	7,700	NA	1,400
Zinc	61,000	560,000	NA	61,000

[1] For all chemicals except the essential nutrients, the U.S. Environmental Protection Agency Region III Risk-Based Concentration (RBC) Table for industrial soil (October 1, 1998) has been used, unless otherwise noted. Screening values are based on a cancer risk of 1×10^{-6} or a hazard quotient of 1.0. Noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998. Cleanup goals are based on a target cancer risk of 1×10^{-6} or a target hazard quotient of 1.
[3] The selected screening concentration for the human health risk assessment is the lowest value of the RBC and the Florida Cleanup Goal.
[4] Naphthalene used as a surrogate.
[5] Pyrene used as a surrogate.
[6] RBC value is based on arsenic's properties as a carcinogen.
[7] Essential nutrient screening value (see GIR Report).
[8] RBC and Florida Cleanup Goal values are based on Chromium VI.
[9] RBC value is based on hydrogen cyanide.
[10] RBC is not available for lead; value is from Revised Interim Guidance on Establishing Soil Lead Cleanup Levels at Superfund Sites (OSWER Directive 9355.4-12).

Notes: μg/kg = micrograms per kilogram.
NA = not applicable.
PCB = polychlorinated biphenyl.
DDD = dichlorodiphenyldichloroethane.
DDE = dichlorodiphenyldichloroethene.
DDT = dichlorodiphenyltrichloroethane.
mg/kg = milligrams per kilogram.

Table C-3
Screening Concentrations for Groundwater for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Federal MCL[2]	Florida Groundwater Cleanup Target Level[3]	Selected Screening Concentration[4]
Volatile Organic Compounds ($\mu g/\ell$)				
Carbon disulfide	100	NSC	[700]	100
Inorganic Analytes ($\mu g/\ell$)				
Arsenic	[5]0.045	50	50	0.045
Barium	260	2,000	2,000	260
Calcium	[6]1,055,398	NSC	NSC	1,055,398
Lead	NSC	[9]15	15	15
Magnesium	[6]118,807	NSC	NSC	118,807
Manganese	73	(50)	(50)	50
Mercury	11	2	2	2
Sodium	[6]396,022	NSC	160,000	160,000
Zinc	1,100	(5,000)	(5,000)	1,100

[1] For all chemicals except the essential nutrients, the U.S.Environmental Protection Agency Region III Risk-Based Concentration (RBC) Table for tap water (May 1996) has been used. Screening values are based on a cancer risk of 1×10^{-6} and a hazard quotient of 1. Per USEPA Region IV Guidance (USEPA, 1995), the noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Federal MCLs are taken from USEPA Drinking Water Regulations and Health Advisories from February 1996. Primary MCLs have no marks, Secondary MCLs are indicated by parentheses ( ), and Federal maximum contaminant level goals (MCLGs) are indicated by brackets [ ]. The lowest of these nonzero values is presented.
[3] Brownfields Cleanup Criteria Rule, Chapter 62-785, Florida Administrative Code, July 6, 1998. Primary Standards have no marks, Secondary Standards are indicated by parentheses ( ), and other criteria (i.e., carcinogen, organoleptic, or a systemic toxicant) are indicated by brackets [ ].
[4] The selected screening concentration for the human health risk assessment is the lowest value of the RBC, Federal MCL value, and Florida Guidance Concentration values.
[5] Value is based on arsenic as a carcinogen.
[6] Essential nutrient screening value (see General Information Report).
[7] RBC value is based on Chromium VI.
[8] Treatment technology action level for copper in drinking water distribution system (USEPA Drinking Water Standards and Health Advisories May 1996).
[9] Treatment technology action level for lead in drinking water (USEPA Drinking Water Standards and Health Advisories, May 1996).

Notes: MCL = maximum contaminant level.
$\mu g/\ell$ = micrograms per liter.
NSC = no screening concentration.

Table C-4
Screening Concentrations for Surface Water for Selection of Chemicals of Potential Concern

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Risk-Based Screening Concentration[1]	Region IV Water Quality Standards[2]	Florida Surface Water Quality Standards[3]	Selected Screening Concentration[4]
Volatile Organic Compounds ($\mu g/\ell$)				
Toluene	75	6,800	NSC	6,800
Inorganic Analytes ($\mu g/\ell$)				
Aluminum	3,700	NSC	NSC	3,700
Arsenic	0.045	0.018	50	0.018
Calcium	[5]1,055,398	NSC	NSC	1,055,398
Iron	1,100	NSC	1,000	1,000
Magnesium	[5]118,807	NSC	NSC	118,807
Manganese	84	NSC	NSC	84
Potassium	[5]297,016	NSC	NSC	297,016
Sodium	[5]396,022	NSC	NSC	396,022

[1] For all chemicals except the essential nutrients, the USEPA Region III RBC Table for tap water (October 22, 1997) has been used. Screening values are based on a cancer risk of 1×10^{-6} and a hazard quotient of 1. Per USEPA Region IV Guidance (USEPA, 1995), the noncarcinogenic RBCs have been adjusted to reflect a target hazard quotient of 0.1.
[2] Region IV Water Quality Standards for human health criteria (water and organism consumption) January 26, 1996.
[3] Florida Surface Water Quality Standards for Class III (Fresh water) Chapter 62-302.530 1996.
[4] The selected screening concentration for the human health risk assessment is the lesser of the Region IV Water Quality Standard or Florida Surface Water Quality Standard. If no surface water quality standards are available then the Region III RBC for tap water was used.
[5] Essential nutrient screening value (see General Information Report).

Notes: $\mu g/\ell$ = micrograms per liter.
NSC = no screening concentration.
RBC = USEPA Region III Risk Based Concentration.

HUMAN HEALTH TOXICITY PROFILES

Aluminum. Aluminum occurs naturally in the soil and makes up approximately 8 percent of the earths crust. Higher soil concentrations are associated with industries which burn coal and aluminum mining and smelting. Human exposures to aluminum may occur through ingestion of foods grown in soil that contains aluminum and use of antacids, antiperspirants, and other drug store items. Aluminum in antiperspirants can cause skin rashes in some people. Factory workers who inhale large amounts of aluminum dust may develop lung problems. Aluminum has caused lower birth weights in some animals. Studies have shown that aluminum accumulates in the brains of people with Alzheimer's disease. However, any causal link between aluminum exposure and this disease is yet to be demonstrated. Both human epidemiological studies and animal experiments strongly suggests that aluminum is not a carcinogen.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1989. "Toxicological Profile for Aluminum"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October 1989.

Antimony. Antimony enters the environment during the mining and processing of its ores and other related metals. Small amounts of antimony are also released into the environment by incinerators and coal-burning power plants. Antimony will strongly adhere to soil which contains iron, manganese, or aluminum. Antimony was used for medicinal purposes to treat people infected with parasites. However, chronic exposure can cause eye, skin, and lung irritation, as well as heart problems, vomiting and diarrhea. The oral RfD was based on changes in glucose and cholesterol levels in an oral drinking water study in rats. Antimony has not been evaluated by the USEPA for evidence of human carcinogenic potential.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1991. "Toxicological Profile for Antimony"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1991.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Aroclors. Aroclors is the trade name for polychlorinated biphenyls [PCBs] produced in the United States by Monsanto Chemical Company. PCBs are a class of compounds in which one to ten atoms are attached to the biphenyl structure. PCBs are subdivided according to the degree of chlorination. The aroclors are identified by a four-digit numbering code in which the first two digits (12) indicate that the parent molecule is biphenyl and the last digits indicate the chlorine content by weight percent. The amount of chlorination of the rings determines the specific structure, or congener, of the aroclor and, subsequently, the specific chemical, physical, and toxicological properties. The excellent dielectric properties, thermal stability, and nonflamability of aroclors has made them ideal for use in electrical transformers and capacitors. Therefore, they have been used in these applications extensively in the past. Humans may be exposed to aroclors when an aroclor-containing electrical component burns or is dismantled. Although the production of aroclors in the U.S. was banned in 1977, aroclors do not readily breakdown, and they may still be present in older electrical equipment, and environmental media.

Following dermal exposure, aroclors have caused a skin rash called chloracne. Aroclors have also produced developmental defects in humans, which have mainly consisted of behavioral abnormalities. These effects have also been observed in animals. Epidemiological studies on occupationally-exposed humans do not conclusively link exposure to aroclors with an increased incidence of cancer. However, chronic oral exposure to aroclors has produced liver cancer in laboratory animals. The potency of the carcinogenic action of aroclors appears to increase as the chlorination of the aroclors increases. Although cancer in laboratory animals has only been conclusively demonstrated for aroclors with the highest percent chlorination (aroclors-1260 and 1254), the USEPA has classified all aroclor congeners as B2, probable human carcinogens.

References:
MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Arsenic. Arsenic was once used in pesticide formulations and has industrial uses in tanneries, as well as the glass and wine making industries. Toxicity depends on its chemical form. Arsenic is an irritant of the skin, mucous membranes, and gastrointestinal tract. Symptoms of acute toxicity include vomiting, diarrhea, convulsions, and a severe drop in blood pressure. Subchronic effects include hyperpigmentation, sensory-motor polyneuropathy, persistent headache, and lethargy. Chronic oral exposure has caused skin lesions, peripheral vascular disease, and peripheral neuropathy. The USEPA has classified arsenic as Group A, human carcinogen, based on increased incidence of skin cancer and lung cancer in epidemiology studies.

References:
Agency for Toxic Substances and Disease Registry (ATSDR), 1992. "Toxicological Profile for Arsenic"; Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, February 1992.

Benzo(a)anthracene. Benzo(a)anthracene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. PAHs are ubiquitous in nature and are also manmade. Benzo(a)anthracene occurs naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. It is also product of pyrolysis in tobacco smoke.

Benzo(a)anthracene has produced skin tumors in laboratory animals after dermal application. Benzo(a)anthracene produced mutations in bacteria and in mammalian cells, and transformed mammalian cells in culture. Although there are no human data that specifically link exposure to benzo(a)anthracene to human cancers, benzo(a)anthracene is a component of mixtures that have been associated with human cancer. As such, benzo(a)anthracene has been classified by USEPA as a B2, probable human carcinogen.

References:
MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Benzo(a)pyrene. Benzo(a)pyrene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. They are ubiquitous in nature and are also man made. Benzo(a)pyrene occurs naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material. Human data demonstrating a causal relationship linking benzo(a)pyrene to carcinogenicity are lacking. However, multiple animal studies in many species demonstrate benzo(a)pyrene to be carcinogenic following administration by a variety of routes. The mechanism through which benzo(a)pyrene elicits its carcinogenic potential is well understood. Benzo(a)pyrene has produced positive results in numerous genotoxicity assays. Benzo(a)pyrene has been classified by the EPA as a B2, probable human carcinogen.

References:
ATSDR, 1989. Toxicological Profile for Polycyclic Aromatic Hydrocarbons. Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1989.

Clayton, George D. and Florence E. Clayton, editors, 1981. Patty's Industrial Hygiene and Toxicology, 3rd Revised Edition; John Wiley & Sons; New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Benzo(b)fluoranthene. Benzo(b)fluoranthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. PAHs are ubiquitous in nature and are also manmade. Benzo(b)fluoranthene occurs naturally in coal tar, crude oil, and is formed from incomplete combustion of organic material.

Although there are no human data that specifically link exposure to benzo(b)fluoranthene to human cancers, benzo(b)fluoranthene is a component of mixtures that have been associated with human cancer. These include coal tar, soots, coke oven emissions and cigarette smoke. Benzo(b)fluoranthene produced tumors in mice after lung implantation, intraperitoneal, or subcutaneous injection, and skin painting. Benzo(b)fluoranthene has produced positive results in several genotoxicity assays. It has been classified as a B2, probable human carcinogen, by the USEPA.

References:
MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Benzo(k)fluoranthene. Benzo(k)fluoranthene is a member of the polycyclic aromatic hydrocarbons (PAH) class of compounds which contain two or more aromatic rings. PAHs are ubiquitous in the environment resulting from the incomplete combustion of organic materials, whether natural or man-made. Benzo(k)fluoranthene also occurs in coal tar, and crude oil.

Although there are no human data that specifically link exposure to benzo(k)fluoranthene to human cancers, benzo(k)fluoranthene is a component of mixtures that have been associated with human cancer. These include coal tar, soots, coke oven emissions and cigarette smoke. Benzo(k)fluoranthene produced tumors after lung implantation in mice and when administered with a promoting agent in skin-painting studies. Benzo(k)fluoranthene is mutagenic in bacteria. Benzo(k)fluoranthene has been classified by USEPA as a B2, probable human carcinogen.

References:
MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Chromium. Chromium has been used in plating for corrosion resistance and decorative purposes, in the manufacture of alloys, and in printing, dying, and photography. The toxicity of chromium depends upon its valence state. Hexavalent chromium is more toxic than trivalent chromium. The effects of inhalation exposure to hexavalent chromium include ulcers of the upper respiratory tract, nasal inflammation, perforation of the nasal septa and lung cancer. Most trivalent chromium compounds are inactive in short-term genotoxicity assays. Trivalent chromium compounds have not been found to be carcinogenic by any route of exposure. There is epidemiological evidence of an association between hexavalent chromium inhalation exposure and lung cancer. The USEPA has classified hexavalent chromium as an Class A, human carcinogen, by the inhalation route.

References:

Amdur, Mary O., John Doull, Curtis D. Klaassen, 1991. Toxicology: The Basic Science of Poisons, 4th edition; Pergamon Press, Inc. New York.

Integrated Risk Information System (IRIS), 1993. United States Environmental Protection Agency.

Chrysene. Chrysene is one of the polycyclic aromatic hydrocarbons (PAH) compounds which are formed during the combustion of organic material. Although there are no human data that specifically link exposure to chrysene to human cancers, chrysene is a component of mixtures that have been associated with human cancer. These include coal tar, soots, coke oven emissions and cigarette smoke. Chrysene produced chromosomal abnormalities in hamsters and mouse germ cells after gavage exposure, positive responses in bacterial gene mutation assays, and transformed mammalian cells exposed in culture. Due to its similarities with benzo(a)pyrene and other carcinogenic PAHs, chrysene has been classified as a B2, probable human carcinogen.

References:

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Dibenzo(a,h)anthracene. Dibenzo(a,h)anthracene is one of the polycyclic aromatic hydrocarbons (PAH) compounds which are formed during the combustion of organic material. This compound is found in tobacco smoke, food, and industrial emissions. Although there are no human data that specifically link exposure to dibenzo(a,h)anthracene to human cancers, dibenzo(a,h)anthracene is a component of mixtures that have been associated with human cancer. These include coal tar, soots, coke oven emissions and cigarette smoke. Dibenzo(a,h)anthracene is metabolized similarly to benzo(a)pyrene, and has produced skin tumors in laboratory animals following dermal exposure. Dibenzo(a,h)anthracene has also been shown to be mutagenic, producing DNA damage in human cell cultures. Due to its similarities with benzo(a)pyrene and other carcinogenic PAHs, dibenzo(a,h)anthracene has been classified as a B2, probable human carcinogen.

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Indeno(1,2,3-cd)pyrene. Indeno(1,2,3-c,d)pyrene is one of the polycyclic aromatic hydrocarbons (PAH) compounds which are formed during the combustion of organic material and is a component of cigarette smoke and smoke stack emissions. No carcinogenicity data specifically for indeno(1,2,3-c,d)pyrene are available in humans, however, toxic effects are attributable to mixtures of PAHs. Animal studies indicate that indeno(1,2,3-c,d)pyrene can induce skin tumors in mice, and may have some immunosuppressive effects. In mammalian cell cultures, indeno(1,2,3-c,d)pyrene was found to be genotoxic. It has been classified by the USEPA as a B2 carcinogen.

References:

MADEP, 1992. "Risk Assessment Shortform Residential Exposure Scenario, Version 1.6"; Policy #WSC/ORS-142-92; Office of Research and Standards and the Bureau of Waste Site Cleanup, Boston, MA; September 1992.

Iron. Iron is a metal which is required for a variety of physiological functions such as heme biosynthesis, oxidative phosphorylation and mixed-function oxidase-mediated metabolic reactions. Only divalent forms of iron are absorbed. As absorption occurs, divalent iron is biochemically converted to trivalent iron, the biologically active form. Under normal conditions, absorbed dietary iron is complexed to hemoglobin and transported to the liver for storage until needed for physiological reactions. The balance of iron is regulated only by the amount of dietary intake and the degree of intestinal absorption. Intestinal absorption tends to be low (2 - 15%) except during periods of increased iron need when absorption efficiency increases dramatically.

Acute iron toxicity has been well characterized following the accidental ingestion of iron-containing preparations by children. Shortly after ingestion, the corrosive effects of iron cause vomiting and diarrhea, often bloody. Later signs include shock, metabolic acidosis, seizures, liver and/or kidney failure, coma, and death. Chronic iron overload manifests as disturbances in liver function, diabetes mellitus, and endocrine and cardiovascular effects. Inhalation of iron containing dust or fumes in occupational settings may result in deposition of iron particles in the lungs leading to interstitial fibrosis. Autopsies of hematite miners noted an increase in lung cancer. However, the etiology of the lung cancer may be related to factors other than iron exposure such as cigarette, silica or PAH exposures.

References:
Aisen, P., Cohen, G. and Kang, J.O., 1990. Iron Toxicosis. Int. Rev. Exp. Pathol. 31:1-46.

Goyer, R.A., 1991. Toxic Effects of Metals. In: Casarett and Doull's Toxicology: The Basic Science of Poisons, 3rd edition. Eds. C.D. Klaassen, M.O. Amdur and J. Doull. Macmillan Publishing Co. N.Y.

Vanadium. Vanadium is widely, but sparsely, distributed in the earth's crust and in the environment. It is invaluable as an alloying agent with steel; ferrovanadium alloys are used in high-stress applications such as bearings, jet engines, and cutting tools. Human and animal studies indicate that vanadium is readily absorbed from the lungs and poorly absorbed from the gastrointestinal tract. It distributes primarily to the bone and kidney. Vanadium is a respiratory irritant. Inhalation of vanadium dusts in both animals and occupationally-exposed workers induces mild to moderate respiratory irritation. The effects are reversible and subside when exposure is discontinued. No studies were located regarding cancer in humans or animals following inhalation, oral, or dermal exposures. However, vanadium has been found to induce DNA damage in human cell cultures, suggesting that vanadium may have the potential to be genotoxic to humans.

References:
ATSDR, 1990. Toxicological Profile for Vanadium. Agency for Toxic Substances and Disease Registry, U.S. Public Health Service, October, 1990.

Table C-5
Oral Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Oral Slope Factor (mg/kg/day)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Volatile Organic Compounds							
2-Hexanone	D	NE					
Semivolatile Organic Compounds							
Benzo(a)Anthracene	B2	7.3	([1])				
Benzo(a)Pyrene	B2	7.3	IRIS	Mouse	Oral-diet	Forestomach	IRIS
Benzo(b)Fluoranthene	B2	7.3	([1])				
Benzo(k)Fluoranthene	B2	7.3	([1])				
Chrysene	B2	7.3	([1])				
Dibenz(a,h)Anthracene	B2	7.3	([1])				
Indeno(1,2,3-cd)Pyrene	B2	7.3	([1])				
Pesticides/PCBs							
Aroclor-1254	B2	7.7e+00	([2])				
Inorganic Analytes							
Aluminum	D	NE					
Antimony	D	NE					
Arsenic	A	1.5e+00	IRIS	Human	Oral-drinking water	Skin	IRIS
Chromium	D	NE					
Iron	D	NE					
Vanadium	D	NE					
Total Petroleum Hydrocarbons							
Total Petroleum Hydrocarbons	D	NE					

See notes on following page.

Table C-5 (Continued)
Oral Dose-Response Data
for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Relative potency factors (USEPA, 1993) have been applied to the ingestion slope factor for benzo(a)pyrene for all PAHs classified as A or B carcinogens.
[2] The ingestion slope factor for PCBs.

Notes: NE = not evaluated.

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of November 1995.

Weight of Evidence (route-specific):
- A = Human carcinogen
- B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
- C = Possible human carcinogen
- D = Not classifiable as to human carcinogenicity

Table C-6
Inhalation Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu g/m^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Volatile Organic Compounds									
2-Hexanone	D	NE		NE					
Semivolatile Organic Compounds									
Benzo(a)Anthracene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(a)Pyrene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(b)Fluoranthene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Benzo(k)Fluoranthene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Chrysene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Dibenz(a,h)Anthracene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Indeno(1,2,3-cd)Pyrene	B2	3.1	Region 4, Guidance	0.88	Region 4, Guidance				
Pesticides/PCBs									
Aroclor-1254	B2	NE		NE					
Inorganic Analytes									
Aluminum	D	NE		NE					
Antimony	D	NE							
Arsenic	A	15.	IRIS	4.3e-03	IRIS	Human	Inhalation	Lung	IRIS
Chromium	A	4.1e+01	HEAST	1.2e-02	IRIS	Human	Inhalation	Lung	IRIS
Iron	D	NE		NE					
Vanadium	D	NE		NE					

See notes at end of table.

Table C-6 (Continued)
Inhalation Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Weight of Evidence	Inhalation Slope Factor (mg/kg/day)(-1)	Source	Inhalation Unit Risk ($\mu g/m^3$)(-1)	Source	Test Species	Exposure Route	Tumor Type	Study Source
Total Petroleum Hydrocarbons									
Total petroleum hydrocarbons	D	NE		NE					

Notes: Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of November 1995.

NE = not evaluated.

Weight of Evidence (route-specific):
A = Human carcinogen
B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C = Possible human carcinogen
D = Not classifiable as to human carcinogenicity

Table C-7
Dermal Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Compound	Weight of Evidence	Oral Slope Factor (mg/kg-day)-1	Oral Absorption Efficiency (%)	Source / Reference	Dermal Slope Factor (mg/kg-day)-1
Volatile Organic Compounds					
2-Hexanone	D	NE			NE
Semivolatile Organic Compounds					
Benzo(a)Anthracene	B2	7.3	91	([1]) / ([2])	8.0
Benzo(a)Pyrene	B2	7.3	91	IRIS / Hecht et al., 1979	8.0
Benzo(b)Fluoranthene	B2	7.3	91	([1]) / ([2])	8.0
Benzo(k)Fluoranthene	B2	7.3	91	([1]) / ([2])	8.0
Chrysene	B2	7.3	91	([1]) / ([2])	8.0
Dibenz(a,h)Anthracene	B2	7.3	91	([1]) / ([2])	8.0
Indeno(1,2,3-cd)Pyrene	B2	7.3	91	([1]) / ([2])	8.0
Pesticides/PCBs					
Aroclor-1254	B2	7.7e+00	90	([3]) / Albro & Fishbein, 1972	8.6e+00
Inorganic Analytes					
Aluminum	D	NE			NE
Antimony	D	NE			
Arsenic	A	1.5e+00	98	Vahter, 1983	1.5e+00
Chromium	D	NE			
Iron	D	NE			NE
Vanadium	D	NE			NE
Total Petroleum Hydrocarbons					
Total petroleum hydrocarbons	D	NE			NE

See notes on following page.

Table C-7 (Continued)
Dermal Dose-Response Data for Carcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] Toxicity value of benzo(a)pyrene used as a surrogate.
[2] The oral absorption efficiency of all PAHs is assumed to be identical to that of benzo(a)pyrene, based on structural analogy.
[3] The ingestion slope factor for PCBs.

Notes: For documentation concerning oral slope factors, refer to Table 1.
NE = not evaluated.

Weight of Evidence (route-specific):
A = Human carcinogen
B = Probable human carcinogen (B1 = limited human evidence; B2 = sufficient human evidence)
C = Possible human carcinogen
D = Not classifiable as to human carcinogenicity

Table C-8
Oral Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	Oral RfD (mg/kg-day)	Source	Oral RfD (mg/kg-day)	Source						
Volatile Organic Compounds										
2-Hexanone	ND		ND							
Semivolatiles Organic Compounds										
Benzo(a)Anthracene	ND		ND							
Benzo(a)Pyrene	ND		ND							
Benzo(b)Fluoranthene	ND		ND							
Benzo(k)Fluoranthene	ND		ND							
Chrysene	ND		ND							
Dibenz(a,h)Anthracene	ND		ND							
Indeno(1,2,3-cd)Pyrene	ND		ND							
Pesticides/PCBs										
Aroclor-1254	2.0e-05	IRIS	5.0e-05	HEAST	Oral-capsule	Medium	Immunological and clinical effects	Monkey	300 H,A,S,L	IRIS
Inorganic Analytes										
Aluminum	1.0e+00	([1])	ND							
Antimony	4.0e-04	IRIS	4.0e-04	HEAST	Oral-drinking water	Low	Reduced lifespan	Rat	1,000 H,A,L	IRIS
Arsenic	3.0e-04	IRIS	3.0e-04	HEAST	Oral-drinking water	Medium	Hyperpigmentation, keratosis	Human	3 D	IRIS
Chromium	5.0e-03	IRIS	2.0e-02	HEAST	Oral-drinking water	Low	No effects observed	Rat	500 H,A,S	IRIS
Iron	3.0e-01	([1])	ND							
Vanadium	7.0e-03	HEAST	7.0e-03	HEAST	Oral-drinking water	Low	No effects observed	Rat	100 H,A	HEAST
Total Petroleum Hydrocarbons										
Total Petroleum Hydrocarbons[2]	3.0e-02	IRIS	3.0e-01	HEAST	Oral-gavage	Low	Renal tubular pathology	Mouse	3000 H,A,S,D	IRIS

See notes on following page.

Table C-8 (Continued)
Oral Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

[1] This value was provided by the Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.
[2] Value for pyrene was used as surrogate for total petroleum hydrocarbons.

Notes: Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as of November 1995.
Environmental Criteria and Assessment Office (ECAO) of the USEPA in response to a specific request.

ND = no data.

Uncertainty factors:
H = Variation in human sensitivity
A = Animal to human extrapolation
S = Extrapolation from subchronic to chronic NOAEL
L = Extrapolation from LOAEL to NOAEL
D = Inadequate data
M = *Modifying factor*

Table C-9
Inhalation Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Chemical	Chronic		Subchronic		Study Type	Confidence Level	Critical Effect	Test Animal	Uncertainty Factor	Study Source
	RfC ($\mu g/m^3$)	Source	RfC ($\mu g/m^3$)	Source						
Volatile Organic Compounds										
2-Hexanone	ND		ND							
Semivolatile Organic Compounds										
Benzo(a)Anthracene	ND		ND							
Benzo(a)Pyrene	ND		ND							
Benzo(b)Fluoranthene	ND		ND							
Benzo(k)Fluoranthene	ND		ND							
Chrysene	ND		ND							
Dibenz(a,h)Anthracene	ND		ND							
Indeno(1,2,3-cd)Pyrene	ND		ND							
Pesticides/PCBs										
Aroclor-1254	ND		ND							
Inorganic Analytes										
Aluminum	ND		ND							
Antimony	ND		ND							
Arsenic	ND		ND							
Chromium	ND		ND							
Iron	ND		ND							
Vanadium	ND		ND							
Total Petroleum Hydrocarbons										
Total Petroleum Hydrocarbons	ND		ND							

See notes on following page.

Table C-9 (Continued)
Inhalation Dose-Response Data
for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

Notes: ND = no data.

Integrated Risk Information System (IRIS) on-line database search, current as of November 1997.
Health Effects Assessment Summary Tables (HEAST), current as November 1995.

Uncertainty factors:

- A = Animal to human extrapolation
- H = Variation in human sensitivity
- S = Extrapolation from subchronic to chronic NOAEL
- L = Extrapolation from LOAEL to NOAEL
- D = Inadequate data
- M = Modifying factor

Table C-10
Dermal Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency (%)	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
Volatile Organic Compounds						
2-Hexanone	ND	ND			ND	ND
Semivolatile Organic Compounds						
Benzo(a)Anthracene	ND	ND	91	([1])	ND	ND
Benzo(a)Pyrene	ND	ND	91	Hecht et al., 1979	ND	ND
Benzo(b)Fluoranthene	ND	ND	91	([1])	ND	ND
Benzo(k)Fluoranthene	ND	ND	91	([1])	ND	ND
Chrysene	ND	ND	91	([1])	ND	ND
Dibenz(a,h)Anthracene	ND	ND	91	([1])	ND	ND
Indeno(1,2,3-cd)Pyrene	ND	ND	91	([1])	ND	ND
Pesticides/PCBs						
Aroclor-1254	2.0e-05	5.0e-05	90	Albro & Fishbein, 1972	1.8e-05	4.5e-05
Inorganic Analytes						
Aluminum	1.0e+00	ND	20	([2])	2.0e-01	ND
Antimony	4.0e-04	4.0e-04	1	ATSDR, 1991	4.0e-06	4.0e-06
Arsenic	3.0e-04	3.0e-04	98	Vahter, 1983	2.9e-04	2.9e-04
Chromium	5.0e-03	2.0e-02	11	Ogawa, 1976	5.5e-04	2.2e-03
Iron	3.0e-01	ND	2	Goyer, 1991	6.0e-03	ND
Vanadium	7.0e-03	7.0e-03	3	ATSDR, 1991d	2.1e-04	2.1e-04

See notes at end of table.

Table C-10 (Continued)
Dermal Dose-Response Data for Noncarcinogenic Effects

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

	Chronic Oral RfD (mg/kg-day)	Subchronic Oral RfD (mg/kg-day)	Oral Absorption Efficiency (%)	Reference	Dermal Chronic RfD (mg/kg-day)	Dermal Subchronic RfD (mg/kg-day)
Total Petroleum Hydrocarbons						
Total petroleum hydrocarbons	3.0e-02	3.0e-01	91	([1])	2.7e-02	2.7e-01

[1] The oral absorption efficiency of all PAHs is assumed to be identical to that of benzo(a)pyrene, based on structural analogy.
[2] *Inorganics lacking specific information on absorption efficiency are assigned a default value of 20%* (USEPA Region IV, 1993).

Notes: ND = no data.

For documentation concerning chronic and subchronic oral RfDs, refer to Table 3.

TABLE C-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	inorganics
	CF	1.00E-09	kg/ug	organics
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DAevent = AF \times ABS_d \times CF$

Note: **For noncarcinogenic effects: AT = ED**

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TABLE C-11

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	5.1E-07	1.5E+00	7.6E-07	0.001	2.9E-08	1.5E+00	4.4E-08	8.1E-07
SUMMARY CANCER RISK						8E-07				4E-08	8E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995)
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	5.2E-03	1E+00	5.2E-03	0.001	3.0E-04	2.0E-01	1.5E-03	6.6E-03
Antimony	I	8.3	mg/kg	1.5E-06	4E-04	3.7E-03	0.001	8.4E-08	4.0E-06	2.1E-02	2.5E-02
Arsenic	I	10.1	mg/kg	1.8E-06	3E-04	5.9E-03	0.001	1.0E-07	2.9E-04	3.5E-04	6.3E-03
Chromium	I	46.2	mg/kg	8.1E-06	5E-03	1.6E-03	0.001	4.7E-07	5.5E-04	8.5E-04	2.5E-03
Iron	I	29800	mg/kg	5.2E-03	3E-01	1.7E-02	0.001	3.0E-04	6.0E-03	5.0E-02	6.8E-02
Vanadium	I	76.7	mg/kg	1.4E-05	7E-03	1.9E-03	0.001	7.8E-07	2.1E-04	3.7E-03	5.6E-03
SUMMARY HAZARD INDEX						0.04				0.1	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1 24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0 833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
CONVERSION FACTOR	CF	0 001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285 6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED

TABLE C-12

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)⁻¹	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	1.4E-11	1.5E+01	2.0E-10
Chromium	I	46.2	mg/kg	3.73E-08	6.2E-11	4.1E+01	2.6E-09
						SUMMARY CANCER RISK	3E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	1.4E-07	ND	
Antimony	I	8.3	mg/kg	6.69E-09	3.9E-11	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	4.8E-11	ND	
Chromium	I	46.2	mg/kg	3.73E-08	2.2E-10	ND	
Iron	I	29800	mg/kg	2.40E-05	1.4E-07	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	3.6E-10	ND	
						SUMMARY HAZARD INDEX	0E+00

TABLE C-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganics
	CF	1.00E-09	kg/mg	Organics
BODY WEIGHT	BW	45	kg	USEPA, 1995
AGE-SPECIFIC BODY WEIGHT	BW_i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	1013	cm^2-year/kg	Per USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] *Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.*
[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 10 age periods, age 7 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = AT \times 365 \text{ days/year)} \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = \text{SUM}(SA_i \times ED_i / BW_i)$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects: AT = ED.

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TABLE C-13

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	4.0E-07	1.5E+00	5.9E-07	0.001	1.8E-08	1.5E+00	2.7E-08	6.2E-07
SUMMARY CANCER RISK						6E-07				3E-08	6E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	8.0E-03	1.0E+00	8.0E-03	0.001	3.7E-04	2.0E-01	1.8E-03	9.9E-03
Antimony	I	8.3	mg/kg	2.3E-06	4.0E-04	5.7E-03	0.001	1.0E-07	4.0E-06	2.6E-02	3.2E-02
Arsenic	I	10.1	mg/kg	2.8E-06	3.0E-04	9.2E-03	0.001	1.3E-07	2.9E-04	4.3E-04	9.7E-03
Chromium	I	46.2	mg/kg	1.3E-05	5.0E-03	2.5E-03	0.001	5.8E-07	5.5E-04	1.0E-03	3.6E-03
Iron	I	29800	mg/kg	8.2E-03	3.0E-01	2.7E-02	0.001	3.7E-04	6.0E-03	6.2E-02	8.9E-02
Vanadium	I	76.7	mg/kg	2.1E-05	7.0E-03	3.0E-03	0.001	9.6E-07	2.1E-04	4.6E-03	7.6E-03
SUMMARY HAZARD INDEX						0.06				0.1	0.2

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	45	kg	USEPA, 1995
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA 1995. Supplemental Guidance to RAGS, Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects: AT = ED

TABLE C-14

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	8.0E-12	1.5E+01	1.2E-10
Chromium	I	46.2	mg/kg	3.73E-08	3.6E-11	4.1E+01	1.5E-09
					SUMMARY CANCER RISK		2E-09

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	1.6E-07	ND	
Antimony	I	8.3	mg/kg	6.69E-09	4.6E-11	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	5.6E-11	ND	
Chromium	I	46.2	mg/kg	3.73E-08	2.6E-10	ND	
Iron	I	29800	mg/kg	2.40E-05	1.6E-07	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	4.2E-10	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-15

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	4.7E-06	1.5E+00	7.1E-06	0.001	2.7E-07	1.5E+00	4.1E-07	7.5E-06
SUMMARY CANCER RISK						7E-06				4E-07	8E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	4.0E-02	1.0E+00	4.0E-02	0.001	2.3E-03	2.0E-01	1.2E-02	5.2E-02
Antimony	I	8.3	mg/kg	1.1E-05	4.0E-04	2.8E-02	0.001	6.5E-07	4.0E-06	1.6E-01	1.9E-01
Arsenic	I	10.1	mg/kg	1.4E-05	3.0E-04	4.6E-02	0.001	8.0E-07	2.9E-04	2.7E-03	4.9E-02
Chromium	I	46.2	mg/kg	6.3E-05	5.0E-03	1.3E-02	0.001	3.6E-06	5.5E-04	6.6E-03	1.9E-02
Iron	I	29800	mg/kg	4.1E-02	3.0E-01	1.4E-01	0.001	2.3E-03	6.0E-03	3.9E-01	5.3E-01
Vanadium	I	76.7	mg/kg	1.1E-04	7.0E-03	1.5E-02	0.001	6.0E-06	2.1E-04	2.9E-02	4.4E-02
SUMMARY HAZARD INDEX						0.3				0.6	0.9

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

TABLE C-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$CA = C \times CF \times (1/PEF)$

Note:

For noncarcinogenic effects: AT = ED

TABLE C-16

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	5.1E-10	1.5E+01	**7.6E-09**
Chromium	I	46.2	mg/kg	3.73E-08	2.3E-09	4.1E+01	**9.6E-08**
				SUMMARY CANCER RISK			**1E-07**

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	4.3E-06	ND	
Antimony	I	8.3	mg/kg	6.69E-09	1.2E-09	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	1.5E-09	ND	
Chromium	I	46.2	mg/kg	3.73E-08	6.8E-09	ND	
Iron	I	29800	mg/kg	2.40E-05	4.4E-06	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	1.1E-08	ND	
				SUMMARY HAZARD INDEX			**0E+00**

TABLE C-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm²	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	766	cm²-year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[2] In estimating the dermally absorbed dose for children age1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$INTAKE_{DERMAL} = (DA_{event} \times EF / AT \times 365\ \text{days/year}) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM\ (SA \times ED / BW)$$

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED.**

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TABLE C-17

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	1.1E-05	1.5E+00	1.7E-05	0.001	1.1E-07	1.5E+00	1.6E-07	1.7E-05
SUMMARY CANCER RISK						2E-05				2E-07	2E-05

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	3.7E-01	1.0E+00	3.7E-01	0.001	3.6E-03	2.0E-01	1.8E-02	3.9E-01
Antimony	I	8.3	mg/kg	1.1E-04	4.0E-04	2.7E-01	0.001	1.0E-06	4.0E-06	2.5E-01	5.2E-01
Arsenic	I	10.1	mg/kg	1.3E-04	3.0E-04	4.3E-01	0.001	1.2E-06	2.9E-04	4.3E-03	4.3E-01
Chromium	I	46.2	mg/kg	5.9E-04	5.0E-03	1.2E-01	0.001	5.7E-06	5.5E-04	1.0E-02	1.3E-01
Iron	I	29800	mg/kg	3.8E-01	3.0E-01	1.3E+00	0.001	3.6E-03	6.0E-03	6.1E-01	1.9E+00
Vanadium	I	76.7	mg/kg	9.8E-04	7.0E-03	1.4E-01	0.001	9.4E-06	2.1E-04	4.5E-02	1.8E-01
SUMMARY HAZARD INDEX						3				0.9	4

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION IN AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	24	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)[1]

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note:
For noncarcinogenic effects: AT = ED

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TABLE C-18

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	6.7E-10	1.5E+01	1.0E-08
Chromium	I	46.2	mg/kg	3.73E-08	3.1E-09	4.1E+01	1.3E-07
				SUMMARY CANCER RISK			1E-07

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	2.3E-05	ND	
Antimony	I	8.3	mg/kg	6.69E-09	6.4E-09	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	7.8E-09	ND	
Chromium	I	46.2	mg/kg	3.73E-08	3.6E-08	ND	
Iron	I	29800	mg/kg	2.40E-05	2.3E-05	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	5.9E-08	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-19

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS: Region IV, Human Health Risk Assessment Bulletin No. 3

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

TABLE C-19

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	2.1E-07	1.5E+00	3.2E-07	0.001	2.4E-08	1.5E+00	3.7E-08	3.5E-07
SUMMARY CANCER RISK						4E-07				5E-08	5E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	1.7E-03	1.0E+00	1.7E-03	0.001	2.0E-04	2.0E-01	9.9E-04	2.7E-03
Antimony	I	8.3	mg/kg	4.9E-07	4.0E-04	1.2E-03	0.001	5.6E-08	4.0E-06	1.4E-02	1.5E-02
Arsenic	I	10.1	mg/kg	5.9E-07	3.0E-04	2.0E-03	0.001	6.8E-08	2.9E-04	2.4E-04	2.2E-03
Chromium	I	46.2	mg/kg	2.7E-06	5.0E-03	5.4E-04	0.001	3.1E-07	5.5E-04	5.7E-04	1.1E-03
Iron	I	29800	mg/kg	1.7E-03	3.0E-01	5.8E-03	0.001	2.0E-04	6.0E-03	3.4E-02	3.9E-02
Vanadium	I	76.7	mg/kg	4.5E-06	7.0E-03	6.4E-04	0.001	5.2E-07	2.1E-04	2.5E-03	3.1E-03
SUMMARY HAZARD INDEX						0.01				0.05	0.06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: **For noncarcinogenic effects, AT = ED**

TABLE C-20

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	6.8E-11	1.5E+01	1.0E-09
Chromium	I	46.2	mg/kg	3.73E-08	3.1E-10	4.1E+01	1.3E-08
				SUMMARY CANCER RISK			1E-08

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	5.5E-07	ND	
Antimony	I	8.3	mg/kg	6.69E-09	1.6E-10	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	1.9E-10	ND	
Chromium	I	46.2	mg/kg	3.73E-08	8.7E-10	ND	
Iron	I	29800	mg/kg	2.40E-05	5.6E-07	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	1.5E-09	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] *Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.*

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:
$DA_{event} = CS \times AF \times ABS \times CF$

Note: For noncarcinogenic effects, AT = ED

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TABLE C-21

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	1.8E-06	1.5E+00	2.6E-06	0.001	8.1E-08	1.5E+00	1.2E-07	2.8E-06
SUMMARY CANCER RISK						3E-06				1E-07	3E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995)
[2] Calculated from oral CSFs

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	1.4E-02	1.0E+00	1.4E-02	0.001	6.6E-04	2.0E-01	3.3E-03	1.8E-02
Antimony	I	8.3	mg/kg	4.1E-06	4.0E-04	1.0E-02	0.001	1.9E-07	4.0E-06	4.7E-02	5.7E-02
Arsenic	I	10.1	mg/kg	4.9E-06	3.0E-04	1.6E-02	0.001	2.3E-07	2.9E-04	7.8E-04	1.7E-02
Chromium	I	46.2	mg/kg	2.3E-05	5.0E-03	4.5E-03	0.001	1.0E-06	5.5E-04	1.9E-03	6.4E-03
Iron	I	29800	mg/kg	1.5E-02	3.0E-01	4.9E-02	0.001	6.7E-04	6.0E-03	1.1E-01	1.6E-01
Vanadium	I	76.7	mg/kg	3.8E-05	7.0E-03	5.4E-03	0.001	1.7E-06	2.1E-04	8.2E-03	1.4E-02
SUMMARY HAZARD INDEX						0.02				0.05	0.07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-22

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0 833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0 001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance
"Standard Default Exposure Factors"; OSWER Directive 9285 6-03
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects, AT = ED.

TABLE C-22

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	1.9E-10	1.5E+01	2.8E-09
Chromium	I	46.2	mg/kg	3.73E-08	8.7E-10	4.1E+01	3.6E-08
				SUMMARY CANCER RISK			4E-08

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	1.5E-06	ND	
Antimony	I	8.3	mg/kg	6.69E-09	4.4E-10	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	5.3E-10	ND	
Chromium	I	46.2	mg/kg	3.73E-08	2.4E-09	ND	
Iron	I	29800	mg/kg	2.40E-05	1.6E-06	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	4.0E-09	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-23

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

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TABLE C-23

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	8.1E-08	1.5E+00	1.2E-07	0.001	9.7E-10	1.5E+00	1.5E-09	1.2E-07
SUMMARY CANCER RISK						5E-08				6E-10	5E-08

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD [1] (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [3] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	1.7E-02	1.0E+00	1.7E-02	0.001	2.0E-04	2.0E-01	9.9E-04	1.8E-02
Antimony	I	8.3	mg/kg	4.7E-06	4.0E-04	1.2E-02	0.001	5.6E-08	4.0E-06	1.4E-02	2.6E-02
Arsenic	I	10.1	mg/kg	5.7E-06	3.0E-04	1.9E-02	0.001	6.8E-08	2.9E-04	2.4E-04	1.9E-02
Chromium	I	46.2	mg/kg	2.6E-05	2.0E-02	1.3E-03	0.001	3.1E-07	5.5E-04	5.7E-04	1.9E-03
Iron	I	29800	mg/kg	1.7E-02	3.0E-01	5.6E-02	0.001	2.0E-04	6.0E-03	3.4E-02	9.0E-02
Vanadium	I	76.7	mg/kg	4.3E-05	7.0E-03	6.2E-03	0.001	5.2E-07	2.1E-04	2.5E-03	8.6E-03
SUMMARY HAZARD INDEX						0.03				0.01	0.04

[1] Subchronic Rfd values were used for the excavation worker due to short exposure scenario.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (USEPA, 1995).
[3] Calculated from oral RfDs.

TABLE C-24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance
Standard Default Exposure Factors; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS - Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note: For noncarcinogens, AT = ED.

TABLE C-24

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Arsenic	I	10.1	mg/kg	8.15E-09	2.7E-12	1.5E+01	4.1E-11
Chromium	I	46.2	mg/kg	3.73E-08	1.2E-11	4.1E+01	5.1E-10
				SUMMARY CANCER RISK			6E-10

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.36E-05	5.5E-07	ND	
Antimony	I	8.3	mg/kg	6.69E-09	1.6E-10	ND	
Arsenic	I	10.1	mg/kg	8.15E-09	1.9E-10	ND	
Chromium	I	46.2	mg/kg	3.73E-08	8.7E-10	ND	
Iron	I	29800	mg/kg	2.40E-05	5.6E-07	ND	
Vanadium	I	76.7	mg/kg	6.19E-08	1.5E-09	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-25

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	inorganics
	CF	1.00E-09	kg/ug	organics
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)[1]

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DAevent = AF \times ABS_d \times CF$

Note: For noncarcinogenic effects: AT = ED

ABB-Environmental Services, Inc.
SS_ING1.XLS
1/9/98

TABLE C-25

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	5.5E-09	7.3E+00	4.0E-08	0.01	3.2E-09	8.0E+00	2.5E-08	6.5E-08
Benzo(a)pyrene	O	1310	ug/kg	6.6E-08	7.3E+00	4.8E-07	0.01	3.8E-08	8.0E+00	3.0E-07	7.8E-07
Benzo(b)fluoranthene	O	142	ug/kg	7.1E-09	7.3E+00	5.2E-08	0.01	4.1E-09	8.0E+00	3.3E-08	8.5E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	5.3E-10	7.3E+00	3.9E-09	0.01	3.0E-10	8.0E+00	2.4E-09	6.3E-09
Chyrsene	O	1.4	ug/kg	7.0E-11	7.3E+00	5.1E-10	0.01	4.1E-11	8.0E+00	3.2E-10	8.4E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	1.7E-08	7.3E+00	1.3E-07	0.01	1.0E-08	8.0E+00	8.0E-08	2.1E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	4.3E-09	7.3E+00	3.1E-08	0.01	2.5E-09	8.0E+00	2.0E-08	5.1E-08
Aroclor-1254	O	365	ug/kg	1.8E-08	7.7E+00	1.4E-07	0.01	1.1E-08	8.6E+00	9.1E-08	2.3E-07
Arsenic	I	6.4	mg/kg	3.2E-07	1.5E+00	4.8E-07	0.001	1.9E-08	1.5E+00	2.8E-08	5.1E-07
SUMMARY CANCER RISK						1E-06				6E-07	2E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	8.5E-10	ND		0.01	4.9E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	1.9E-07	ND		0.01	1.1E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	2.3E-07	ND		0.01	1.3E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	2.5E-07	ND		0.01	1.4E-07	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	1.8E-07	ND		0.01	1.1E-07	ND		
Chrysene	O	1400	ug/kg	2.5E-07	ND		0.01	1.4E-07	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	6.1E-08	ND		0.01	3.5E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	1.5E-07	ND		0.01	8.6E-08	ND		
Aroclor-1254	O	365	ug/kg	6.4E-08	2.0E-05	3.2E-03	0.01	3.7E-08	1.8E-05	2.1E-03	5.3E-03
Aluminum	I	24300	mg/kg	4.3E-03	1.0E+00	4.3E-03	0.001	2.5E-04	2.0E-01	1.2E-03	5.5E-03
Arsenic	I	6.4	mg/kg	1.1E-06	3.0E-04	3.8E-03	0.001	6.5E-08	2.9E-04	2.2E-04	4.0E-03
Iron	I	17500	mg/kg	3.1E-03	3.0E-01	1.0E-02	0.001	1.8E-04	6.0E-03	3.0E-02	4.0E-02
Vanadium	I	45.2	mg/kg	8.0E-06	7.0E-03	1.1E-03	0.001	4.6E-07	2.1E-04	2.2E-03	3.3E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	1.2E-04	3.0E-02	3.9E-03	0.01	6.7E-05	2.7E-02	2.5E-03	6.4E-03
SUMMARY HAZARD INDEX						0.03				0.04	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-26

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: **For noncarcinogenic effects, AT = ED**

TABLE C-26

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	1.5E-13	3.1E+00	4.6E-13
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	1.8E-12	3.1E+00	5.5E-12
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	1.9E-13	3.1E+00	6.0E-13
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	1.4E-14	3.1E+00	4.4E-14
Chrysene	O	1.4	ug/kg	1.13E-12	1.9E-15	3.1E+00	5.9E-15
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	4.7E-13	3.1E+00	1.5E-12
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	1.2E-13	3.1E+00	3.6E-13
Aroclor-1254	I	365	mg/kg	2.94E-07	4.9E-10	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	8.7E-12	1.5E+01	1.3E-10
						SUMMARY CANCER RISK	1E-10

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	2.3E-14	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	5.2E-12	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	6.2E-12	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	6.7E-12	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	5.0E-12	ND	
Chrysene	O	1400	ug/kg	1.13E-09	6.6E-12	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	4.0E-12	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	4.0E-12	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	1.7E-09	ND	
Aluminum	I	24300	mg/kg	1.96E-05	1.2E-07	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	3.0E-11	ND	
Iron	I	17500	mg/kg	1.41E-05	8.3E-08	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	2.1E-10	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	3.2E-09	ND	
						SUMMARY HAZARD INDEX	0E+00

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1991
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganics
	CF	1.00E-09	kg/mg	Organics
BODY WEIGHT	BW	45	kg	USEPA, 1995
AGE-SPECIFIC BODY WEIGHT	BW_i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	1013	cm^2-year/kg	Per USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.
[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 10 age periods, age 7 through 16, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM(SA_i \times ED_i / BW_i)$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects: AT = ED.

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	4.3E-09	7.3E+00	3.1E-08	0.01	1.9E-09	8.0E+00	1.6E-08	4.7E-08
Benzo(a)pyrene	O	1310	ug/kg	5.1E-08	7.3E+00	3.7E-07	0.01	2.3E-08	8.0E+00	1.9E-07	5.6E-07
Benzo(b)fluoranthene	O	142	ug/kg	5.6E-09	7.3E+00	4.1E-08	0.01	2.5E-09	8.0E+00	2.0E-08	6.1E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	4.1E-10	7.3E+00	3.0E-09	0.01	1.9E-10	8.0E+00	1.5E-09	4.5E-09
Chyrsene	O	1.4	ug/kg	5.5E-11	7.3E+00	4.0E-10	0.01	2.5E-11	8.0E+00	2.0E-10	6.0E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	1.4E-08	7.3E+00	9.9E-08	0.01	6.2E-09	8.0E+00	5.0E-08	1.5E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	3.3E-09	7.3E+00	2.4E-08	0.01	1.5E-09	8.0E+00	1.2E-08	3.7E-08
Aroclor-1254	O	365	ug/kg	1.4E-08	7.7E+00	1.1E-07	0.01	6.5E-09	8.6E+00	5.6E-08	1.7E-07
Arsenic	I	6.4	mg/kg	2.5E-07	1.5E+00	3.8E-07	0.001	1.1E-08	1.5E+00	1.7E-08	3.9E-07
SUMMARY CANCER RISK						1E-06				4E-07	1E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	1.3E-09	ND		0.01	6.0E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	3.0E-07	ND		0.01	1.4E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	3.6E-07	ND		0.01	1.6E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	3.9E-07	ND		0.01	1.8E-07	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	2.9E-07	ND		0.01	1.3E-07	ND		
Chrysene	O	1400	ug/kg	3.8E-07	ND		0.01	1.7E-07	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	9.5E-08	ND		0.01	4.3E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	2.3E-07	ND		0.01	1.1E-07	ND		
Aroclor-1254	O	365	ug/kg	1.0E-07	2.0E-05	5.0E-03	0.01	4.6E-08	1.8E-05	2.5E-03	7.5E-03
Aluminum	I	24300	mg/kg	6.7E-03	1.0E+00	6.7E-03	0.001	3.0E-04	2.0E-01	1.5E-03	8.2E-03
Arsenic	I	6.4	mg/kg	1.8E-06	3.0E-04	5.8E-03	0.001	8.0E-08	2.9E-04	2.8E-04	6.1E-03
Iron	I	17500	mg/kg	4.8E-03	3.0E-01	1.6E-02	0.001	2.2E-04	6.0E-03	3.6E-02	5.2E-02
Vanadium	I	45.2	mg/kg	1.2E-05	7.0E-03	1.8E-03	0.001	5.6E-07	2.1E-04	2.7E-03	4.5E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	1.8E-04	3.0E-02	6.1E-03	0.01	8.3E-05	2.7E-02	3.1E-03	9.2E-03
SUMMARY HAZARD INDEX						0.05				0.05	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-28

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	45	kg	USEPA, 1995
EXPOSURE TIME	ET	4	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285.6-03
USEPA 1995. Supplemental Guidance to RAGS, Region 4 Bulletins, Bulletin No 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogenic effects: AT = ED

TABLE C-28

INHALATION OF PARTICULATES - SURFACE SOIL
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	8.6E-14	3.1E+00	2.7E-13
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	1.0E-12	3.1E+00	3.2E-12
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	1.1E-13	3.1E+00	3.5E-13
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	8.3E-15	3.1E+00	2.6E-14
Chrysene	O	1.4	ug/kg	1.13E-12	1.1E-15	3.1E+00	3.4E-15
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	2.7E-13	3.1E+00	8.5E-13
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	6.7E-14	3.1E+00	2.1E-13
Aroclor-1254	I	365	mg/kg	2.94E-07	2.9E-10	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	5.1E-12	1.5E+01	7.6E-11
						SUMMARY CANCER RISK	8E-11

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	2.7E-14	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	6.0E-12	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	7.2E-12	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	7.8E-12	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	5.8E-12	ND	
Chrysene	O	1400	ug/kg	1.13E-09	7.7E-12	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	4.7E-12	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	4.7E-12	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	2.0E-09	ND	
Aluminum	I	24300	mg/kg	1.96E-05	1.3E-07	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	3.5E-11	ND	
Iron	I	17500	mg/kg	1.41E-05	9.7E-08	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	2.5E-10	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	3.7E-09	ND	
						SUMMARY HAZARD INDEX	0E+00

TABLE C-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1995
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year [1]	Assumption
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment. Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS. Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: **For noncarcinogenic effects, AT = ED.**

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TABLE C-29

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	5.1E-08	7.3E+00	3.7E-07	0.01	2.9E-08	8.0E+00	2.4E-07	6.1E-07
Benzo(a)pyrene	O	1310	ug/kg	6.2E-07	7.3E+00	4.5E-06	0.01	3.5E-07	8.0E+00	2.8E-06	7.3E-06
Benzo(b)fluoranthene	O	142	ug/kg	6.7E-08	7.3E+00	4.9E-07	0.01	3.8E-08	8.0E+00	3.1E-07	7.9E-07
Benzo(k)fluoranthene	O	10.5	ug/kg	4.9E-09	7.3E+00	3.6E-08	0.01	2.8E-09	8.0E+00	2.3E-08	5.9E-08
Chyrsene	O	1.4	ug/kg	6.6E-10	7.3E+00	4.8E-09	0.01	3.8E-10	8.0E+00	3.0E-09	7.8E-09
Dibenzo(a,h)anthracene	O	347	ug/kg	1.6E-07	7.3E+00	1.2E-06	0.01	9.4E-08	8.0E+00	7.5E-07	1.9E-06
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	4.0E-08	7.3E+00	2.9E-07	0.01	2.3E-08	8.0E+00	1.8E-07	4.8E-07
Aroclor-1254	O	365	ug/kg	1.7E-07	7.7E+00	1.3E-06	0.01	9.9E-08	8.6E+00	8.5E-07	2.2E-06
Arsenic	I	6.4	mg/kg	3.0E-06	1.5E+00	4.5E-06	0.001	1.7E-07	1.5E+00	2.6E-07	4.8E-06
SUMMARY CANCER RISK						1E-05				5E-06	2E-05

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	6.6E-09	ND		0.01	3.8E-09	ND		
Benzo(a)anthracene	O	1090	ug/kg	1.5E-06	ND		0.01	8.6E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	1.8E-06	ND		0.01	1.0E-06	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	1.9E-06	ND		0.01	1.1E-06	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	1.4E-06	ND		0.01	8.3E-07	ND		
Chrysene	O	1400	ug/kg	1.9E-06	ND		0.01	1.1E-06	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	4.8E-07	ND		0.01	2.7E-07	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	1.2E-06	ND		0.01	6.7E-07	ND		
Aroclor-1254	O	365	ug/kg	5.0E-07	2.0E-05	2.5E-02	0.01	2.9E-07	1.8E-05	1.6E-02	4.1E-02
Aluminum	I	24300	mg/kg	3.3E-02	1.0E+00	3.3E-02	0.001	1.9E-03	2.0E-01	9.6E-03	4.3E-02
Arsenic	I	6.4	mg/kg	8.8E-06	3.0E-04	2.9E-02	0.001	5.0E-07	2.9E-04	1.7E-03	3.1E-02
Iron	I	17500	mg/kg	2.4E-02	3.0E-01	8.0E-02	0.001	1.4E-03	6.0E-03	2.3E-01	3.1E-01
Vanadium	I	45.2	mg/kg	6.2E-05	7.0E-03	8.8E-03	0.001	3.6E-06	2.1E-04	1.7E-02	2.6E-02
Total Petroleum Hydrocarbon	O	666000	ug/kg	9.1E-04	3.0E-02	3.0E-02	0.01	5.2E-04	2.7E-02	1.9E-02	5.0E-02
SUMMARY HAZARD INDEX						0.2				0.3	0.5

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

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TABLE C-30

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	16	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR (mg/kg-day)[1]

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$CA = C \times CF \times (1/PEF)$

Note:

For noncarcinogenic effects: AT = ED

TABLE C-30

INHALATION OF PARTICULATES - SURFACE SOIL
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	5.5E-12	3.1E+00	1.7E-11
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	6.6E-11	3.1E+00	2.1E-10
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	7.2E-12	3.1E+00	2.2E-11
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	5.3E-13	3.1E+00	1.6E-12
Chrysene	O	1.4	ug/kg	1.13E-12	7.1E-14	3.1E+00	2.2E-13
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	1.8E-11	3.1E+00	5.4E-11
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	4.3E-12	3.1E+00	1.3E-11
Aroclor-1254	O	365	ug/kg	2.94E-10	1.8E-11	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	3.2E-10	1.5E+01	4.8E-09
				SUMMARY CANCER RISK			5E-09

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	7.1E-13	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	1.6E-10	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	1.9E-10	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	2.1E-10	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	1.5E-10	ND	
Chrysene	O	1400	ug/kg	1.13E-09	2.1E-10	ND	
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	5.1E-11	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	1.3E-10	ND	
Aroclor-1254	O	365	ug/kg	2.94E-10	5.4E-11	ND	
Aluminum	I	24300	mg/kg	1.96E-05	3.6E-06	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	9.4E-10	ND	
Iron	I	17500	mg/kg	1.41E-05	2.6E-06	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	6.7E-09	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	9.8E-08	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-31

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	200	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100 %	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	766	cm^2-year/kg	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1995

[1] Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.

[2] In estimating the dermally absorbed dose for children age1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; January 1992.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day)} / \text{REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = (DA_{event} \times EF / AT \times 365 \text{ days/year}) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = \text{SUM } (SA \times ED / BW)$$

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED.

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TABLE C-31

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	1.2E-07	7.3E+00	8.7E-07	0.01	1.1E-08	8.0E+00	9.2E-08	9.6E-07
Benzo(a)pyrene	O	1310	ug/kg	1.4E-06	7.3E+00	1.0E-05	0.01	1.4E-07	8.0E+00	1.1E-06	1.2E-05
Benzo(b)fluoranthene	O	142	ug/kg	1.6E-07	7.3E+00	1.1E-06	0.01	1.5E-08	8.0E+00	1.2E-07	1.3E-06
Benzo(k)fluoranthene	O	10.5	ug/kg	1.2E-08	7.3E+00	8.4E-08	0.01	1.1E-09	8.0E+00	8.8E-09	9.3E-08
Chyrsene	O	1.4	ug/kg	1.5E-09	7.3E+00	1.1E-08	0.01	1.5E-10	8.0E+00	1.2E-09	1.2E-08
Dibenzo(a,h)anthracene	O	347	ug/kg	3.8E-07	7.3E+00	2.8E-06	0.01	3.6E-08	8.0E+00	2.9E-07	3.1E-06
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	9.4E-08	7.3E+00	6.8E-07	0.01	9.0E-09	8.0E+00	7.2E-08	7.5E-07
Aroclor-1254	O	365	ug/kg	4.0E-07	7.7E+00	3.1E-06	0.01	3.8E-08	8.6E+00	3.3E-07	3.4E-06
Arsenic	I	6.4	mg/kg	7.0E-06	1.5E+00	1.1E-05	0.001	6.7E-08	1.5E+00	1.0E-07	1.1E-05
SUMMARY CANCER RISK						3E-05				2E-06	3E-05

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0 1% for inorganics (November 1995)
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	6.1E-08	ND		0.01	5.9E-09	ND		
Benzo(a)anthracene	O	1090	ug/kg	1.4E-05	ND		0.01	1.3E-06	ND		
Benzo(a)pyrene	O	1310	ug/kg	1.7E-05	ND		0.01	1.6E-06	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	1.8E-05	ND		0.01	1.7E-06	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	1.3E-05	ND		0.01	1.3E-06	ND		
Chrysene	O	1400	ug/kg	1.8E-05	ND		0.01	1.7E-06	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	4.4E-06	ND		0.01	4.2E-07	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	1.1E-05	ND		0.01	1.0E-06	ND		
Aroclor-1254	O	365	ug/kg	4.7E-06	2.0E-05	2.3E-01	0.01	4.5E-07	1.8E-05	2.5E-02	2.6E-01
Aluminum	I	24300	mg/kg	3.1E-01	1.0E+00	3.1E-01	0.001	3.0E-03	2.0E-01	1.5E-02	3.3E-01
Arsenic	I	6.4	mg/kg	8.2E-05	3.0E-04	2.7E-01	0.001	7.8E-07	2.9E-04	2.7E-03	2.8E-01
Iron	I	17500	mg/kg	2.2E-01	3.0E-01	7.5E-01	0.001	2.1E-03	6.0E-03	3.6E-01	1.1E+00
Vanadium	I	45.2	mg/kg	5.8E-04	7.0E-03	8.3E-02	0.001	5.5E-06	2.1E-04	2.6E-02	1.1E-01
Total Petroleum Hydrocarbon	O	666000	ug/kg	8.5E-03	3.0E-02	2.8E-01	0.01	8.2E-04	2.7E-02	3.0E-02	3.1E-01
SUMMARY HAZARD INDEX						2				0.5	3

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-32

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION IN AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.625	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
EXPOSURE TIME	ET	24	hours/day	Assumption
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1991
EXPOSURE DURATION	ED	6	years	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note:
For noncarcinogenic effects: AT = ED

TABLE C-32

INHALATION OF PARTICULATES - SURFACE SOIL
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	7.2E-12	3.1E+00	2.2E-11
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	8.7E-11	3.1E+00	2.7E-10
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	9.4E-12	3.1E+00	2.9E-11
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	7.0E-13	3.1E+00	2.2E-12
Chrysene	O	1.4	ug/kg	1.13E-12	9.3E-14	3.1E+00	2.9E-13
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	2.3E-11	3.1E+00	7.1E-11
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	5.7E-12	3.1E+00	1.8E-11
Aroclor-1254	I	365	mg/kg	2.94E-07	2.4E-08	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	4.2E-10	1.5E+01	6.4E-09
SUMMARY CANCER RISK							7E-09

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	3.7E-12	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	8.4E-10	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	1.0E-09	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	1.1E-09	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	8.1E-10	ND	
Chrysene	O	1400	ug/kg	1.13E-09	1.1E-09	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	6.6E-10	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	6.6E-10	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	2.8E-07	ND	
Aluminum	I	24300	mg/kg	1.96E-05	1.9E-05	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	4.9E-09	ND	
Iron	I	17500	mg/kg	1.41E-05	1.4E-05	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	3.5E-08	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	5.2E-07	ND	
SUMMARY HAZARD INDEX							0E+00

TABLE C-33

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B, 1/92

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

TABLE C-33

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	2.3E-09	7.3E+00	1.7E-08	0.01	2.6E-09	8.0E+00	2.1E-08	3.8E-08
Benzo(a)pyrene	O	1310	ug/kg	2.7E-08	7.3E+00	2.0E-07	0.01	3.2E-08	8.0E+00	2.5E-07	4.5E-07
Benzo(b)fluoranthene	O	142	ug/kg	3.0E-09	7.3E+00	2.2E-08	0.01	3.4E-09	8.0E+00	2.7E-08	4.9E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	2.2E-10	7.3E+00	1.6E-09	0.01	2.5E-10	8.0E+00	2.0E-09	3.6E-09
Chyrsene	O	1.4	ug/kg	2.9E-11	7.3E+00	2.1E-10	0.01	3.4E-11	8.0E+00	2.7E-10	4.8E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	7.3E-09	7.3E+00	5.3E-08	0.01	8.4E-09	8.0E+00	6.7E-08	1.2E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	1.8E-09	7.3E+00	1.3E-08	0.01	2.1E-09	8.0E+00	1.6E-08	3.0E-08
Aroclor-1254	O	365	ug/kg	7.7E-09	7.7E+00	5.9E-08	0.01	8.8E-09	8.6E+00	7.6E-08	1.3E-07
Arsenic	I	6.4	mg/kg	1.3E-07	1.5E+00	2.0E-07	0.001	1.5E-08	1.5E+00	2.3E-08	2.2E-07
SUMMARY CANCER RISK						6E-07				5E-07	1E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	2.8E-10	ND		0.01	3.2E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	6.4E-08	ND		0.01	7.4E-08	ND		
Benzo(a)pyrene	O	1310	ug/kg	7.7E-08	ND		0.01	8.8E-08	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	8.3E-08	ND		0.01	9.6E-08	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	6.2E-08	ND		0.01	7.1E-08	ND		
Chrysene	O	1400	ug/kg	8.2E-08	ND		0.01	9.5E-08	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	2.0E-08	ND		0.01	2.3E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	5.0E-08	ND		0.01	5.8E-08	ND		
Aroclor-1254	O	365	ug/kg	2.1E-08	2.0E-05	1.1E-03	0.01	2.5E-08	1.8E-05	1.4E-03	2.4E-03
Aluminum	I	24300	mg/kg	1.4E-03	1.0E+00	1.4E-03	0.001	1.6E-04	2.0E-01	8.2E-04	2.2E-03
Arsenic	I	6.4	mg/kg	3.8E-07	3.0E-04	1.3E-03	0.001	4.3E-08	2.9E-04	1.5E-04	1.4E-03
Iron	I	17500	mg/kg	1.0E-03	3.0E-01	3.4E-03	0.001	1.2E-04	6.0E-03	2.0E-02	2.3E-02
Vanadium	I	45.2	mg/kg	2.7E-06	7.0E-03	3.8E-04	0.001	3.1E-07	2.1E-04	1.5E-03	1.8E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	3.9E-05	3.0E-02	1.3E-03	0.01	4.5E-05	2.7E-02	1.7E-03	3.0E-03
SUMMARY HAZARD INDEX						0.01				0.03	0.04

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

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TABLE C-34

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$CA = C \times CF \times (1/PEF)$

Note: For noncarcinogenic effects, AT = ED

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TABLE C-34

INHALATION OF PARTICULATES - SURFACE SOIL
SITE MAINTENANCE WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	7.4E-13	3.1E+00	2.3E-12
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	8.9E-12	3.1E+00	2.7E-11
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	9.6E-13	3.1E+00	3.0E-12
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	7.1E-14	3.1E+00	2.2E-13
Chrysene	O	1.4	ug/kg	1.13E-12	9.5E-15	3.1E+00	2.9E-14
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	2.3E-12	3.1E+00	7.3E-12
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	5.8E-13	3.1E+00	1.8E-12
Aroclor-1254	I	365	mg/kg	2.94E-07	2.5E-09	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	4.3E-11	1.5E+01	6.5E-10
				SUMMARY CANCER RISK			7E-10

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	9.1E-14	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	2.1E-11	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	2.5E-11	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	2.7E-11	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	2.0E-11	ND	
Chrysene	O	1400	ug/kg	1.13E-09	2.7E-11	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	1.6E-11	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	1.6E-11	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	6.9E-09	ND	
Aluminum	I	24300	mg/kg	1.96E-05	4.6E-07	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	1.2E-10	ND	
Iron	I	17500	mg/kg	1.41E-05	3.3E-07	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	8.6E-10	ND	
Total Petroleum Hydrocarbo	O	666000	ug/kg	5.37E-07	1.3E-08	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-35

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1995
EXPOSURE DURATION	ED	25	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B; 1/92.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE}_{\text{-INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE}_{\text{-DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ \text{days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED

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TABLE C-35

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	1.9E-08	7.3E+00	1.4E-07	0.01	8.8E-09	8.0E+00	7.0E-08	2.1E-07
Benzo(a)pyrene	O	1310	ug/kg	2.3E-07	7.3E+00	1.7E-06	0.01	1.1E-07	8.0E+00	8.4E-07	2.5E-06
Benzo(b)fluoranthene	O	142	ug/kg	2.5E-08	7.3E+00	1.8E-07	0.01	1.1E-08	8.0E+00	9.1E-08	2.7E-07
Benzo(k)fluoranthene	O	10.5	ug/kg	1.8E-09	7.3E+00	1.3E-08	0.01	8.4E-10	8.0E+00	6.8E-09	2.0E-08
Chyrsene	O	1.4	ug/kg	2.4E-10	7.3E+00	1.8E-09	0.01	1.1E-10	8.0E+00	9.0E-10	2.7E-09
Dibenzo(a,h)anthracene	O	347	ug/kg	6.1E-08	7.3E+00	4.4E-07	0.01	2.8E-08	8.0E+00	2.2E-07	6.7E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	1.5E-08	7.3E+00	1.1E-07	0.01	6.9E-09	8.0E+00	5.5E-08	1.6E-07
Aroclor-1254	O	365	ug/kg	6.4E-08	7.7E+00	4.9E-07	0.01	2.9E-08	8.6E+00	2.5E-07	7.4E-07
Arsenic	I	6.4	mg/kg	1.1E-06	1.5E+00	1.7E-06	0.001	5.1E-08	1.5E+00	7.7E-08	1.8E-06
SUMMARY CANCER RISK						2E-06				1E-06	3E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	2.3E-09	ND		0.01	1.1E-09	ND		
Benzo(a)anthracene	O	1090	ug/kg	5.3E-07	ND		0.01	2.5E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	6.4E-07	ND		0.01	2.9E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	6.9E-07	ND		0.01	3.2E-07	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	5.1E-07	ND		0.01	2.4E-07	ND		
Chrysene	O	1400	ug/kg	6.8E-07	ND		0.01	3.2E-07	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	1.7E-07	ND		0.01	7.8E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	4.2E-07	ND		0.01	1.9E-07	ND		
Aroclor-1254	O	365	ug/kg	1.8E-07	2.0E-05	8.9E-03	0.01	8.2E-08	1.8E-05	4.6E-03	1.3E-02
Aluminum	I	24300	mg/kg	1.2E-02	1.0E+00	1.2E-02	0.001	5.5E-04	2.0E-01	2.7E-03	1.5E-02
Arsenic	I	6.4	mg/kg	3.1E-06	3.0E-04	1.0E-02	0.001	1.4E-07	2.9E-04	5.0E-04	1.1E-02
Iron	I	17500	mg/kg	8.6E-03	3.0E-01	2.9E-02	0.001	3.9E-04	6.0E-03	6.6E-02	9.4E-02
Vanadium	I	45.2	mg/kg	2.2E-05	7.0E-03	3.2E-03	0.001	1.0E-06	2.1E-04	4.8E-03	8.0E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	3.3E-04	3.0E-02	1.1E-02	0.01	1.5E-04	2.7E-02	5.6E-03	1.6E-02
SUMMARY HAZARD INDEX						0.08				0.08	0.17

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-36

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	0.833	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	250	days/year	Assumption
EXPOSURE DURATION	ED	25	years	USEPA, 1995
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	25	years	USEPA, 1995

[1] Florida Soil Clean-Up Goal Variable. FDEP, 1995.
USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance:*
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$CA = C \times CF \times (1/PEF)$$

Note: **For noncarcinogenic effects, AT = ED.**

TABLE C-36

INHALATION OF PARTICULATES - SURFACE SOIL
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	2.0E-12	3.1E+00	6.3E-12
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	2.5E-11	3.1E+00	7.6E-11
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	2.7E-12	3.1E+00	8.3E-12
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	2.0E-13	3.1E+00	6.1E-13
Chrysene	O	1.4	ug/kg	1.13E-12	2.6E-14	3.1E+00	8.2E-14
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	6.5E-12	3.1E+00	2.0E-11
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	1.6E-12	3.1E+00	5.0E-12
Aroclor-1254	I	365	mg/kg	2.94E-07	6.9E-09	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	1.2E-10	1.5E+01	1.8E-09
				SUMMARY CANCER RISK			2E-09

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m³)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	2.5E-13	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	5.7E-11	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	6.9E-11	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	7.5E-11	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	5.5E-11	ND	
Chrysene	O	1400	ug/kg	1.13E-09	7.4E-11	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	4.5E-11	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	4.5E-11	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	1.9E-08	ND	
Aluminum	I	24300	mg/kg	1.96E-05	1.3E-06	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	3.4E-10	ND	
Iron	I	17500	mg/kg	1.41E-05	9.2E-07	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	2.4E-09	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	3.5E-08	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-37

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	480	mg/day	USEPA, 1995
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	1	mg/cm^2-event	USEPA, 1995
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,750	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	30	days/year [1]	Assumption
EXPOSURE DURATION	ED	1	years	USEPA, 1991
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors", OSWER Directive 9285.6-03.

USEPA, 1992. Dermal Exposure Assessment: Principles and Applications, EPA/600/8-91/011B, 1/92.

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{-INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{-DERMAL}} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

TABLE C-37

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)^-1	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.8E-10	7.3E+00	6.4E-09	0.01	1.1E-10	8.0E+00	8.4E-10	7.2E-09
Benzo(a)pyrene	O	1310	ug/kg	1.1E-08	7.3E+00	7.7E-08	0.01	1.3E-09	8.0E+00	1.0E-08	8.7E-08
Benzo(b)fluoranthene	O	142	ug/kg	1.1E-09	7.3E+00	8.3E-09	0.01	1.4E-10	8.0E+00	1.1E-09	9.4E-09
Benzo(k)fluoranthene	O	10.5	ug/kg	8.5E-11	7.3E+00	6.2E-10	0.01	1.0E-11	8.0E+00	8.1E-11	7.0E-10
Chyrsene	O	1.4	ug/kg	1.1E-11	7.3E+00	8.2E-11	0.01	1.4E-12	8.0E+00	1.1E-11	9.3E-11
Dibenzo(a,h)anthracene	O	347	ug/kg	2.8E-09	7.3E+00	2.0E-08	0.01	3.3E-10	8.0E+00	2.7E-09	2.3E-08
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.9E-10	7.3E+00	5.0E-09	0.01	8.2E-11	8.0E+00	6.6E-10	5.7E-09
Aroclor-1254	O	365	ug/kg	2.9E-09	7.7E+00	2.3E-08	0.01	3.5E-10	8.6E+00	3.0E-09	2.6E-08
Arsenic	I	6.4	mg/kg	5.2E-08	1.5E+00	7.7E-08	0.001	6.2E-10	1.5E+00	9.3E-10	7.8E-08
SUMMARY CANCER RISK						5E-08				6E-10	5E-08

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD [1] (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [3] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	2.7E-09	ND		0.01	3.2E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	6.1E-07	ND		0.01	7.4E-08	ND		
Benzo(a)pyrene	O	1310	ug/kg	7.4E-07	ND		0.01	8.8E-08	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	8.0E-07	ND		0.01	9.6E-08	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	5.9E-07	ND		0.01	7.1E-08	ND		
Chrysene	O	1400	ug/kg	7.9E-07	ND		0.01	9.5E-08	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	2.0E-07	ND		0.01	2.3E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	4.8E-07	5.0E-05	9.6E-03	0.01	5.8E-08	4.8E-05	1.2E-03	1.1E-02
Aroclor-1254	O	365	ug/kg	2.1E-07	2.0E-05	1.0E-02	0.01	2.5E-08	1.8E-05	1.4E-03	1.2E-02
Aluminum	I	24300	mg/kg	1.4E-02	1.0E+00	1.4E-02	0.001	1.6E-04	2.0E-01	8.2E-04	1.5E-02
Arsenic	I	6.4	mg/kg	3.6E-06	3.0E-04	1.2E-02	0.001	4.3E-08	2.9E-04	1.5E-04	1.2E-02
Iron	I	17500	mg/kg	9.9E-03	3.0E-01	3.3E-02	0.001	1.2E-04	6.0E-03	2.0E-02	5.3E-02
Vanadium	I	45.2	mg/kg	2.5E-05	7.0E-03	3.6E-03	0.001	3.1E-07	2.1E-04	1.5E-03	5.1E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	3.8E-04	3.0E-01	1.3E-03	0.01	4.5E-05	2.7E-01	1.7E-04	1.4E-03
SUMMARY HAZARD INDEX						0.10				0.03	0.1

[1] Subchronic Rfd values were used for the excavation worker due to short exposure scenario.
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (USEPA, 1995).
[3] Calculated from oral RfDs.

TABLE C-38

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
SOIL CONCENTRATION	C	chemical-specific	chemical-specific	
PART. EMISSION FACTOR	PEF	1.24E+09	m^3/kg	default [1]
CONCENTRATION AIR	CA	chemical-specific	mg/m^3	
INHALATION RATE	IR	2.5	$m^3/hour$	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE TIME	ET	8	hours/day	Assumption
EXPOSURE FREQUENCY	EF	30	days/year	Assumption
EXPOSURE DURATION	ED	1	years	Assumption
CONVERSION FACTOR	CF	0.001	mg/ug	Organics only
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	1	years	USEPA, 1991

[1] Florida Soil Clean-Up Goal Variable FDEP, 1995.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance
Standard Default Exposure Factors, OSWER Directive 9285 6-03.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x INHALATION CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

'HAZARD QUOTIENT = INTAKE (mg/kg-day) / INHALATION REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

CA = C x CF x (1/PEF)

Note: For noncarcinogens, AT = ED.

TABLE C-38

INHALATION OF PARTICULATES - SURFACE SOIL
EXCAVATION WORKER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION CSF (mg/kg-day)^-1	CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	8.79E-11	2.9E-14	3.1E+00	9.1E-14
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	3.5E-13	3.1E+00	1.1E-12
Benzo(b)fluoranthene	O	142	ug/kg	1.15E-10	3.8E-14	3.1E+00	1.2E-13
Benzo(k)fluoranthene	O	10.5	ug/kg	8.47E-12	2.8E-15	3.1E+00	8.8E-15
Chrysene	O	1.4	ug/kg	1.13E-12	3.8E-16	3.1E+00	1.2E-15
Dibenzo(a,h)anthracene	O	347	ug/kg	2.80E-10	9.4E-14	3.1E+00	2.9E-13
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	6.89E-11	2.3E-14	3.1E+00	7.2E-14
Aroclor-1254	I	365	mg/kg	2.94E-07	9.9E-11	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	1.7E-12	1.5E+01	2.6E-11
				SUMMARY CANCER RISK			3E-11

[1] Toxicity equivalent factors are applied to carcinogenic PAHs per USEPA Region IV Guidance (USEPA, 1995).

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	AIR CONCENTRATION (mg/m^3)	INTAKE (mg/kg-day)	INHALATION RfD (mg/kg-day)	HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.87E-12	9.1E-14	ND	
Benzo(a)anthracene	O	1090	ug/kg	8.79E-10	2.1E-11	ND	
Benzo(a)pyrene	O	1310	ug/kg	1.06E-09	2.5E-11	ND	
Benzo(b)fluoranthene	O	1420	ug/kg	1.15E-09	2.7E-11	ND	
Benzo(k)fluoranthene	O	1050	ug/kg	8.47E-10	2.0E-11	ND	
Chrysene	O	1400	ug/kg	1.13E-09	2.7E-11	ND	
Dibenzo(a,h)anthracene	O	854	ug/kg	6.89E-10	1.6E-11	ND	
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	6.89E-10	1.6E-11	ND	
Aroclor-1254	I	365	mg/kg	2.94E-07	6.9E-09	ND	
Aluminum	I	24300	mg/kg	1.96E-05	4.6E-07	ND	
Arsenic	I	6.4	mg/kg	5.16E-09	1.2E-10	ND	
Iron	I	17500	mg/kg	1.41E-05	3.3E-07	ND	
Vanadium	I	45.2	mg/kg	3.65E-08	8.6E-10	ND	
Total Petroleum Hydrocarbons	O	666000	ug/kg	5.37E-07	1.3E-08	ND	
				SUMMARY HAZARD INDEX			0E+00

TABLE C-39

INGESTION OF GROUNDWATER AS DRINKING WATER UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	2	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	24	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-39

INGESTION OF GROUNDWATER AS DRINKING WATER UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	2.2	UG/LITER	2.1E-05	1.5	3.1E-05
				TOTAL CANCER RISK	3E-05

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Aluminum	1300	UG/LITER	3.6E-02	1.0E+00	3.6E-02
Arsenic	2.2	UG/LITER	6.0E-05	3.0E-04	2.0E-01
				TOTAL HAZARD INDEX	0.2
ND = no data available.					

TABLE C-40

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 9
MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1	liters/day	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	6	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-40

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
CHILD RESIDENT
SITE 9
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	2.2	UG/LITER	1.2E-05	1.5	1.8E-05
			TOTAL CANCER RISK		2E-05

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Aluminum	1300	UG/LITER	8.3E-02	1.0E+00	8.3E-02
Arsenic	2.2	UG/LITER	1.4E-04	3.0E-04	4.7E-01
			TOTAL HAZARD INDEX		0.6

TABLE C-41

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRESPASSER - WADING
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
SURFACE AREA [2]	SA	5,750	cm^2	USEPA, 1992
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	20	years	Assumption
DIFFUSION DEPTH PER EVENT	PC_{event}	chemical-specific	cm/event	[3]
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	20	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-45.
[4] PC_{event} calculated per the Dermal Guidance See Table C-45.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times ED \times SA}{AT \times BW \times 365 \text{ days/yr}}$$

Where:
$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	3.7E-08	1.5E+00	5.5E-08	0.0026	2.1E-08	1.5E+00	3.2E-08	8.7E-08
SUMMARY CANCER RISK					5E-08				3E-08	9E-08

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral CSFs.
NE = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	1.3E-07	3.0E-04	4.3E-04	0.0026	7.4E-08	2.9E-04	2.5E-04	6.8E-04
SUMMARY HAZARD INDEX					4E-04				3E-04	7E-04

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-41

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT TRESPASSER - WADING
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	3.7E-08	1.5E+00	5.5E-08	0.0026	2.1E-08	1.5E+00	3.2E-08	**8.7E-08**
				SUMMARY CANCER RISK	**5E-08**				**3E-08**	**9E-08**

[1] This chemical-specific value has been calculated in Table C-45
[2] Calculated from oral CSFs.
NE = not evaluated.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	1.3E-07	3.0E-04	4.3E-04	0.0026	7.4E-08	2.9E-04	2.5E-04	**6.8E-04**
				SUMMARY HAZARD INDEX	**4E-04**				**3E-04**	**7E-04**

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-42

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSER - WADING
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	45	kg	USEPA, 1995
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	10	years	USEPA, 1995
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	1013	cm^2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	10	years	USEPA, 1995
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-45.
[4] PC_{event} calculated per the Dermal Guidance See Table C-45.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365 \text{ days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-42

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADOLESCENT TRESPASSER - WADING
SITE 9
MILTON, FLORIDA

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	2.8E-08	1.5E+00	4.3E-08	0.0026	1.3E-08	1.5E+00	1.9E-08	**6.2E-08**
			SUMMARY CANCER RISK		**4E-08**				**2E-08**	**6E-08**

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral CSFs.
ND = no data available.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	2.0E-07	3.0E-04	6.6E-04	0.0026	9.1E-08	2.9E-04	3.1E-04	**9.8E-04**
			SUMMARY HAZARD INDEX		**7E-04**				**3E-04**	**1E-03**

[1] This chemical-specific value has been calculated in Table C-45
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.026	liters/day	USEPA, 1995
SURFACE AREA [2]	SA	5,750	cm2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	70	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DAevent	chemical-specific	mg/cm2-event	Calculated
EXPOSURE TIME	ET	2.6	hours/day	Assumption
EXPOSURE FREQUENCY	EF	45	days/year	Assumption
EXPOSURE DURATION	ED	24	years	Assumption
DIFFUSION DEPTH PER EVENT	PCevent	chemical-specific	cm/event	Calculated per USEPA, 1992 [3]
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	24	years	USEPA, 1995
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm3	

[1] Ingestion Rate = 0.026 l/day = 10 ml/hour x 2.6 hours/day x 0.001 l/ml
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-45.
[4] PC_{event} calculated per the Dermal Guidance See Table C-45.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters."
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B.
USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DAevent \times EV \times EF \times ED \times SA}{AT \times BW \times 365 \text{ days/yr}}$$

Where:
DAevent = PCevent x CW x CF1 x CF2

Note: For noncarcinogenic effects, AT = ED.

TABLE C-43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT[2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	4.4E-08	1.5E+00	6.6E-08	0.0026	2.5E-08	1.5E+00	3.8E-08	1.0E-07
SUMMARY CANCER RISK					7E-08				4E-08	1E-07

[1] This chemical-specific value has been calculated in Table C-45.
[2] This chemical-specific value is calculated in Table 21.
[3] Calculated from oral CSFs.
ND = no data available.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	1.3E-07	3.0E-04	4.3E-04	0.0026	7.4E-08	2.9E-04	2.5E-04	6.8E-04
SUMMARY HAZARD INDEX					4E-04				3E-04	7E-04

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.13	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	766	cm^2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml.
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-45.
[4] PC_{event} calculated per the Dermal Guidance See Table C-45.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365\ \text{days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

$DA_{event} = PC_{event} \times CW \times CF1 \times CF2$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-43

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
ADULT RESIDENT - WADING
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF [1] (mg/kg-day)^-1	CANCER RISK INGESTION	PCEVENT[2] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [1, 3] (mg/kg-day)^-1	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	4.4E-08	1.5E+00	6.6E-08	0.0026	2.5E-08	1.5E+00	3.8E-08	1.0E-07
SUMMARY CANCER RISK					7E-08				4E-08	1E-07

[1] This chemical-specific value has been calculated in Table C-45.
[2] This chemical-specific value is calculated in Table 21.
[3] Calculated from oral CSFs.
ND = no data available.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT[1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)^-1	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	1.3E-07	3.0E-04	4.3E-04	0.0026	7.4E-08	2.9E-04	2.5E-04	6.8E-04
SUMMARY HAZARD INDEX					4E-04				3E-04	7E-04

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE [1]	IR	0.13	liters/day	USEPA, 1995
AGE-SPECIFIC SURFACE AREA [2]	SA	age-specific	cm^2	USEPA, 1989
EVENT FREQUENCY	EV	1	events/day	Assumption
BODY WEIGHT	BW	15	kg	USEPA, 1991
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	Calculated
EXPOSURE FREQUENCY	EF	100	days/year	Assumption
EXPOSURE DURATION	ED	6	years	Assumption
AGE-WEIGHTED SURFACE AREA [3]	SAsw/adj	766	cm^2-yr/kg	Calculated per USEPA, 1992
DIFFUSION DEPTH PER EVENT [4]	PC_{event}	chemical-specific	cm/event	Calculated per USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	6	years	Assumption
CONVERSION FACTOR	CF1	0.001	mg/ug	
CONVERSION FACTOR	CF2	0.001	liter/cm^3	

[1] Ingestion Rate = 0.13 l/day = 50 ml/hour x 2.6 hours/day x 0.001 l/ml.
[2] Surface area assumes lower legs, hands, and feet are exposed.
[3] PCevent is calculated in the Dermal Guidance See Table C-45.
[4] PC_{event} calculated per the Dermal Guidance See Table C-45.

USEPA, 1989. Exposure Factors Handbook; EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Parameters";
USEPA, 1992. Dermal Exposure Assessment: Principles and Applications; EPA/600/8-91/011B

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE-INGESTION} = \frac{CW \times IR \times EF \times ED \times CF1}{BW \times AT \times 365\ \text{days/yr}}$$

$$\text{INTAKE-DERMAL} = \frac{DA_{event} \times EV \times EF \times SAsw/adj}{AT \times 365\ \text{days/yr}}$$

Where:

SAsw/adj = Sum (SA x ED / BW)

DA_{event} = PC_{event} x CW x CF1 x CF2

Note: For noncarcinogenic effects, AT = ED.

TABLE C-44

INGESTION OF AND DIRECT CONTACT WITH SURFACE WATER
CHILD RESIDENT - WADING
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF	CANCER RISK INGESTION	PCEVENT [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2]	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	2.8	ug/L	5.7E-07	1.5E+00	8.5E-07	0.0026	2.2E-08	1.5E+00	3.3E-08	**8.9E-07**
SUMMARY CANCER RISK					**9E-07**				**3E-08**	**9E-07**

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral CSFs.
ND = no data available.

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	PCEVENT [1] (cm/event)	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Arsenic	2.8	ug/L	6.6E-06	3.0E-04	2.2E-02	0.0026	2.5E-07	2.9E-04	8.8E-04	**2.3E-02**
SUMMARY HAZARD INDEX					**2E-02**				**9E-04**	**2E-02**

[1] This chemical-specific value has been calculated in Table C-45.
[2] Calculated from oral RfDs.
ND = no data available.

TABLE C-45

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm²-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm²	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm²-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";
OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-45

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	6.9E-07	1.5	1.0E-06	0.001	1.4E-08	1.5	2.1E-08	1.1E-06
SUMMARY CANCER RISK						1E-06				2E-08	1E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995)
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	2.0E-02	1.0E+00	0.020	0.001	4.0E-04	2.0E-01	0.002	0.022
Antimony	I	8.3	mg/kg	5.7E-06	4.0E-04	0.014	0.001	1.1E-07	4.0E-06	0.03	0.043
Arsenic	I	10.1	mg/kg	6.9E-06	3.0E-04	0.023	0.001	1.4E-07	2.9E-04	0.0005	0.024
Chromium	I	46.2	mg/kg	3.2E-05	5.0E-03	0.006	0.001	6.3E-07	5.5E-04	0.001	0.007
Iron	I	29800	mg/kg	2.0E-02	3.0E-01	0.068	0.001	4.1E-04	6.0E-03	0.07	0.136
Vanadium	I	70.1	mg/kg	4.8E-05	7.0E-03	0.007	0.001	9.6E-07	2.1E-04	0.005	0.011
SUMMARY HAZARD INDEX						0.1				0.1	0.2

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995)
[2] Calculated from oral RfDs.

TABLE C-46

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1996
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	662.8	cm^2-year/kg	GIR -Table C-5-5; USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
	AT	2	years	USEPA, 1992

[1] Air Force meterological data summary for Eglin AFB (close proximity to Milton) states that there is 0.01 inches of rain for 110 days per year. Exposure frequency assumes half of the rainy days require indoor restriction.

[2] In estimating the dermally absorbed dose for children age1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS: Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook; 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = (DA_{event} \times EF / AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM\ (SA \times ED / BW)$$

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: For noncarcinogenic effects, AT = ED.

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TABLE C-46

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FIELD
SITE 9

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	1.8E-06	1.5	2.8E-06	0.001	1.8E-08	1.5	2.8E-08	2.8E-06
				SUMMARY CANCER RISK		3E-06				3E-08	3E-06

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	1.9E-01	1.0E+00	0.187	0.001	1.9E-03	2.0E-01	0.00931	0.197
Antimony	I	8.3	mg/kg	5.3E-05	4.0E-04	0.133	0.001	5.3E-07	4.0E-06	0.13188	0.265
Arsenic	I	10.1	mg/kg	6.5E-05	3.0E-04	0.215	0.001	6.4E-07	2.9E-04	0.00221	0.217
Chromium	I	46.2	mg/kg	3.0E-04	5.0E-03	0.059	0.001	2.9E-06	5.5E-04	0.00534	0.064
Iron	I	29800	mg/kg	1.9E-01	3.0E-01	0.635	0.001	1.9E-03	6.0E-03	0.31566	0.951
Vanadium	I	70.1	mg/kg	4.5E-04	7.0E-03	0.064	0.001	4.5E-06	2.1E-04	0.02122	0.085
				SUMMARY HAZARD INDEX		1.3				0.49	1.8

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-47

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 9

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	50%	unitless	Assumption
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,000	cm^2	USEPA, 1996
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	9	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	9	years	USEPA, 1992

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance "Standard Default Exposure Factors";

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters

USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.

USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{-INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{-DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

TABLE C-47

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL - CENTRAL TENDENCY
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 9

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [2] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Arsenic	I	10.1	mg/kg	3.2E-07	1.5	4.8E-07	0.001	5.1E-09	1.5	7.6E-09	4.8E-07
SUMMARY CANCER RISK						5E-07				8E-09	5E-07

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
Aluminum	I	29300	mg/kg	7.2E-03	1.0E+00	7.2E-03	0.001	1.1E-04	2.0E-01	5.7E-04	7.7E-03
Antimony	I	8.3	mg/kg	2.0E-06	4.0E-04	5.1E-03	0.001	3.2E-08	4.0E-06	8.1E-03	1.3E-02
Arsenic	I	10.1	mg/kg	2.5E-06	3.0E-04	8.2E-03	0.001	4.0E-08	2.9E-04	1.4E-04	8.4E-03
Chromium	I	46.2	mg/kg	1.1E-05	5.0E-03	2.3E-03	0.001	1.8E-07	5.5E-04	3.3E-04	2.6E-03
Iron	I	29800	mg/kg	7.3E-03	3.0E-01	2.4E-02	0.001	1.2E-04	6.0E-03	1.9E-02	4.4E-02
Vanadium	I	70.1	mg/kg	1.7E-05	7.0E-03	2.4E-03	0.001	2.7E-07	2.1E-04	1.3E-03	3.8E-03
SUMMARY HAZARD INDEX						0.05				0.03	0.08

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-48

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 9
MILTON, FLORIDA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	1.4	liters/day	USEPA, 1995
BODY WEIGHT	BW	70	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	7	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{\text{CW x IR x EF x ED x CF}}{\text{BW x AT x 365 days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-48

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES)
ADULT RESIDENT
SITE 9
MILTON, FLORIDA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	2.2	UG/LITER	4.2E-06	1.5	6.3E-06
			TOTAL CANCER RISK		6E-06

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Aluminum	1300	UG/LITER	2.5E-02	1.0E+00	2.5E-02
Arsenic	2.2	UG/LITER	4.2E-05	3.0E-04	1.4E-01
			TOTAL HAZARD INDEX		0.2

ND = no data available.

TABLE C-49

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 9
MILTON, FLORDIA

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION WATER	CW	chemical-specific	ug/liter	
INGESTION RATE	IR	0.7	liters/day	USEPA, 1995
BODY WEIGHT	BW	15	kg	USEPA, 1991
CONVERSION FACTOR	CF	0.001	mg/ug	
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1995
EXPOSURE DURATION	ED	2	years	USEPA, 1995
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1991

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance:
"Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1995. Region IV Supplemental Gudance to RAGS, Bulletin No. 3, November.

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)-1

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$\text{INTAKE} = \frac{CW \times IR \times EF \times ED \times CF}{BW \times AT \times 365 \text{ days/year}}$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-49

INGESTION OF GROUNDWATER AS DRINKING WATER (UNFILTERED SAMPLES) (CENTRAL TENDENCY)
CHILD RESIDENT
SITE 9
MILTON, FLORDIA

CARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	CANCER SLOPE FACTOR (mg/kg-day)^-1	CANCER RISK INGESTION
Arsenic	2.2	UG/LITER	2.8E-06	1.5	4.2E-06
			TOTAL CANCER RISK		4E-06

NONCARCINOGENIC EFFECTS

COMPOUND	WATER CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	REFERENCE DOSE (mg/kg-day)	HAZARD QUOTIENT INGESTION
Aluminum	1300	UG/LITER	5.8E-02	1.0E+00	5.8E-02
Arsenic	2.2	UG/LITER	9.8E-05	3.0E-04	3.3E-01
			TOTAL HAZARD INDEX		0.4

TABLE C-50

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	350	days/year	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";
OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

$$\text{CANCER RISK} = \text{INTAKE (mg/kg-day)} \times \text{CANCER SLOPE FACTOR (mg/kg-day)}^{-1}$$

$$\text{HAZARD QUOTIENT} = \text{INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)}$$

$$\text{INTAKE}_{\text{INGESTION}} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$\text{INTAKE}_{\text{DERMAL}} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

Where:

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects, AT = ED.

TABLE C-50

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	7.5E-09	7.3E+00	5.5E-08	0.01	1.5E-09	8.0E+00	1.2E-08	6.6E-08
Benzo(a)pyrene	O	1310	ug/kg	9.0E-08	7.3E+00	6.6E-07	0.01	1.8E-08	8.0E+00	1.4E-07	8.0E-07
Benzo(b)fluoranthene	O	142	ug/kg	9.7E-09	7.3E+00	7.1E-08	0.01	1.9E-09	8.0E+00	1.6E-08	8.7E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	7.2E-10	7.3E+00	5.3E-09	0.01	1.4E-10	8.0E+00	1.2E-09	6.4E-09
Chyrsene	O	1.4	ug/kg	9.6E-11	7.3E+00	7.0E-10	0.01	1.9E-11	8.0E+00	1.5E-10	8.5E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	2.4E-08	7.3E+00	1.7E-07	0.01	4.8E-09	8.0E+00	3.8E-08	2.1E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	5.8E-09	7.3E+00	4.3E-08	0.01	1.2E-09	8.0E+00	9.4E-09	5.2E-08
Aroclor-1254	O	365	ug/kg	2.5E-08	7.7E+00	1.9E-07	0.01	5.0E-09	8.6E+00	4.3E-08	2.4E-07
Arsenic	I	6.4	mg/kg	4.4E-07	1.5E+00	6.6E-07	0.001	8.8E-09	1.5E+00	1.3E-08	6.7E-07
SUMMARY CANCER RISK						2E-06				3E-07	2E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.3E-09	ND		0.01	6.6E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	7.5E-07	ND		0.01	1.5E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	9.0E-07	ND		0.01	1.8E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	9.7E-07	ND		0.01	1.9E-07	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	7.2E-07	ND		0.01	1.4E-07	ND		
Chrysene	O	1400	ug/kg	9.6E-07	ND		0.01	1.9E-07	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	2.4E-07	ND		0.01	4.8E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	5.8E-07	ND		0.01	1.2E-07	ND		
Aroclor-1254	O	365	ug/kg	2.5E-07	2.0E-05	1.3E-02	0.01	5.0E-08	1.8E-05	2.8E-03	1.5E-02
Aluminum	I	24300	mg/kg	1.7E-02	1.0E+00	1.7E-02	0.001	3.3E-04	2.0E-01	1.7E-03	1.8E-02
Arsenic	I	6.4	mg/kg	4.4E-06	3.0E-04	1.5E-02	0.001	8.8E-08	2.9E-04	3.0E-04	1.5E-02
Iron	I	17500	mg/kg	1.2E-02	3.0E-01	4.0E-02	0.001	2.4E-04	6.0E-03	4.0E-02	8.0E-02
Vanadium	I	45.2	mg/kg	3.1E-05	7.0E-03	4.4E-03	0.001	6.2E-07	2.1E-04	2.9E-03	7.4E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	4.6E-04	3.0E-02	1.5E-02	0.01	9.1E-05	2.7E-02	3.4E-03	1.9E-02
SUMMARY HAZARD INDEX						0.1				0.1	0.2

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November, 1995).
[2] Calculated from oral RfDs.

TABLE C-51

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	100	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
AGE-SPECIFIC SURFACE AREA	SA	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	15	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	350	days/year [1]	USEPA, 1996
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AGE-SPECIFIC EXPOSURE DURATION	ED	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	766	cm^2-year/kg	GIR -Table C-5-5; USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1992

[1] Air Force meterological data summary for Eglin AFB (close proximity to Milton) states that there is 0.01 inches of rain for 110 days per year. Exposure frequency assumes half of the rainy days require indoor restriction.

[2] In estimating the dermally absorbed dose for children age1 through 6, the time-weighted, bodyweight normalized surface area exposed is calculated from surface area, exposure duration, and body weight for each of 6 age periods, age 1 through 6, per USEPA, 1992.

USEPA, 1989. Exposure Factors Handbook;EPA/600/8-89/043; May 1989.
USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook; 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = (DA_{event} \times EF / AT \times 365\ days/year) \times SA_{soil/adj}$$

Where:

$SA_{soil/adj}$ = SUM (SA x ED / BW)

DA_{event} = CS x AF x ABS x CF

Note: For noncarcinogenic effects, AT = ED.

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TABLE C-51

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
CHILD RESIDENT
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	2.0E-08	7.3E+00	1.5E-07	0.01	2.3E-09	8.0E+00	1.8E-08	1.6E-07
Benzo(a)pyrene	O	1310	ug/kg	2.4E-07	7.3E+00	1.7E-06	0.01	2.7E-08	8.0E+00	2.2E-07	2.0E-06
Benzo(b)fluoranthene	O	142	ug/kg	2.6E-08	7.3E+00	1.9E-07	0.01	3.0E-09	8.0E+00	2.4E-08	2.1E-07
Benzo(k)fluoranthene	O	10.5	ug/kg	1.9E-09	7.3E+00	1.4E-08	0.01	2.2E-10	8.0E+00	1.8E-09	1.6E-08
Chyrsene	O	1.4	ug/kg	2.6E-10	7.3E+00	1.9E-09	0.01	2.9E-11	8.0E+00	2.4E-10	2.1E-09
Dibenzo(a,h)anthracene	O	347	ug/kg	6.3E-08	7.3E+00	4.6E-07	0.01	7.3E-09	8.0E+00	5.8E-08	5.2E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	1.6E-08	7.3E+00	1.1E-07	0.01	1.8E-09	8.0E+00	1.4E-08	1.3E-07
Aroclor-1254	O	365	ug/kg	6.7E-08	7.7E+00	5.1E-07	0.01	7.7E-09	8.6E+00	6.6E-08	5.8E-07
Arsenic	I	6.4	mg/kg	1.2E-06	1.5E+00	1.8E-06	0.001	1.3E-08	1.5E+00	2.0E-08	1.8E-06
				SUMMARY CANCER RISK		5E-06				4E-07	5E-06

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	3.1E-08	ND		0.01	3.5E-09	ND		
Benzo(a)anthracene	O	1090	ug/kg	7.0E-06	ND		0.01	8.0E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	8.4E-06	ND		0.01	9.6E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	9.1E-06	ND		0.01	1.0E-06	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	6.7E-06	ND		0.01	7.7E-07	ND		
Chrysene	O	1400	ug/kg	8.9E-06	ND		0.01	1.0E-06	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	2.2E-06	ND		0.01	2.5E-07	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	5.5E-06	ND		0.01	6.3E-07	ND		
Aroclor-1254	O	365	ug/kg	2.3E-06	2.0E-05	1.2E-01	0.01	2.7E-07	1.8E-05	1.5E-02	1.3E-01
Aluminum	I	24300	mg/kg	1.6E-01	1.0E+00	1.6E-01	0.001	1.8E-03	2.0E-01	8.9E-03	1.6E-01
Arsenic	I	6.4	mg/kg	4.1E-05	3.0E-04	1.4E-01	0.001	4.7E-07	2.9E-04	1.6E-03	1.4E-01
Iron	I	17500	mg/kg	1.1E-01	3.0E-01	3.7E-01	0.001	1.3E-03	6.0E-03	2.1E-01	5.9E-01
Vanadium	I	45.2	mg/kg	2.9E-04	7.0E-03	4.1E-02	0.001	3.3E-06	2.1E-04	1.6E-02	5.7E-02
Total Petroleum Hydrocarbon	O	666000	ug/kg	4.3E-03	3.0E-02	1.4E-01	0.01	4.9E-04	2.7E-02	1.8E-02	1.6E-01
				SUMMARY HAZARD INDEX		1				0.3	1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

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TABLE C-52

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS_d	chemical specific	unitless	USEPA, 1995
SURFACE AREA EXPOSED	SA	5,000	cm^2	USEPA, 1992
DOSE ABSORBED PER EVENT	DAevent	chemical specific	mg/cm^2-event	USEPA, 1992
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
	CF	1.00E-09	kg/ug	Organic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	45	days/year	USEPA, 1992
EXPOSURE DURATION	ED	7	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	7	years	USEPA, 1992

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors";
OSWER Directive 9285.6-03.
USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DAevent \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$DAevent = AF \times ABS_d \times CF$

Note: For noncarcinogenic effects: AT = ED

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TABLE C-52

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADULT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	9.6E-10	7.3E+00	7.0E-09	0.01	1.9E-10	8.0E+00	1.5E-09	8.5E-09
Benzo(a)pyrene	O	1310	ug/kg	1.2E-08	7.3E+00	8.4E-08	0.01	2.3E-09	8.0E+00	1.8E-08	1.0E-07
Benzo(b)fluoranthene	O	142	ug/kg	1.3E-09	7.3E+00	9.1E-09	0.01	2.5E-10	8.0E+00	2.0E-09	1.1E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	9.2E-11	7.3E+00	6.8E-10	0.01	1.8E-11	8.0E+00	1.5E-10	8.2E-10
Chyrsene	O	1.4	ug/kg	1.2E-11	7.3E+00	9.0E-11	0.01	2.5E-12	8.0E+00	2.0E-11	1.1E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	3.1E-09	7.3E+00	2.2E-08	0.01	6.1E-10	8.0E+00	4.9E-09	2.7E-08
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	7.5E-10	7.3E+00	5.5E-09	0.01	1.5E-10	8.0E+00	1.2E-09	6.7E-09
Aroclor-1254	O	365	ug/kg	3.2E-09	7.7E+00	2.5E-08	0.01	6.4E-10	8.6E+00	5.5E-09	3.0E-08
Arsenic	I	6.4	mg/kg	5.6E-08	1.5E+00	8.5E-08	0.001	1.1E-09	1.5E+00	1.7E-09	8.6E-08
SUMMARY CANCER RISK						2E-07				4E-08	3E-07

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	4.2E-10	ND		0.01	8.5E-11	ND		
Benzo(a)anthracene	O	1090	ug/kg	9.6E-08	ND		0.01	1.9E-08	ND		
Benzo(a)pyrene	O	1310	ug/kg	1.2E-07	ND		0.01	2.3E-08	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	1.3E-07	ND		0.01	2.5E-08	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	9.2E-08	ND		0.01	1.8E-08	ND		
Chrysene	O	1400	ug/kg	1.2E-07	ND		0.01	2.5E-08	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	3.1E-08	ND		0.01	6.1E-09	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	7.5E-08	ND		0.01	1.5E-08	ND		
Aroclor-1254	O	365	ug/kg	3.2E-08	2.0E-05	1.6E-03	0.01	6.4E-09	1.8E-05	3.6E-04	2.0E-03
Aluminum	I	24300	mg/kg	2.1E-03	1.0E+00	2.1E-03	0.001	4.3E-05	2.0E-01	2.1E-04	2.4E-03
Arsenic	I	6.4	mg/kg	5.6E-07	3.0E-04	1.9E-03	0.001	1.1E-08	2.9E-04	3.9E-05	1.9E-03
Iron	I	17500	mg/kg	1.5E-03	3.0E-01	5.1E-03	0.001	3.1E-05	6.0E-03	5.1E-03	1.0E-02
Vanadium	I	45.2	mg/kg	4.0E-06	7.0E-03	5.7E-04	0.001	8.0E-08	2.1E-04	3.8E-04	9.5E-04
Total Petroleum Hydrocarbon	O	666000	ug/kg	5.9E-05	3.0E-02	2.0E-03	0.01	1.2E-05	2.7E-02	4.3E-04	2.4E-03
SUMMARY HAZARD INDEX						0.02				0.01	0.02

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

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TABLE C-53

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	USEPA, 1995
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
AGE-SPECIFIC SURFACE AREA	SA_i	age-specific	cm^2	USEPA, 1989
ABSORPTION FRACTION	ABS_d	chemical-specific	unitless	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
	CF	1.00E-09	kg/mg	Organic conversion
BODY WEIGHT	BW	45	kg	USEPA, 1991
AGE-SPECIFIC BODY WEIGHT	BW_i	age-specific	kg	USEPA, 1989
EXPOSURE FREQUENCY	EF	45	days/year [1]	USEPA, 1996
EXPOSURE DURATION	ED	2	years	USEPA, 1992
AGE-SPECIFIC EXPOSURE DURATION	ED_i	age-specific	years	Assumption
AGE-WEIGHTED SURFACE AREA [2]	$SA_{soil/adj}$	1013	cm^2-year/kg	GIR -Table C-5-5; USEPA, 1992
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	2	years	USEPA, 1992

[1] *Units for exposure frequency are in events/year in the calculation of the dermally absorbed dose.*

[2] In estimating the dermally absorbed dose for children age 7 through 16, the time-weighted, bodyweight normalized surface area exposed is

USEPA, 1989. Exposure Factors Handbook:EPA/600/8-89/043; May 1989.

USEPA, 1991. Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"; OSWER Directive 9285.6-03.

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.

USEPA, 1995. Supplemental Guidance to RAGS: Region 4 Bulletins, Bulletin No. 3, November 1995.

USEPA, 1996. Exposure Factors Handbook 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR (mg/kg-day)$^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365 \text{ days/yr}}$$

$$INTAKE_{DERMAL} = AT \times 365 \text{ days/year}) \times SA_{soil/adj}$$

Where:

$$SA_{soil/adj} = SUM\ (SA_i \times ED_i / BW_i)$$

$$DA_{event} = CS \times AF \times ABS_d \times CF$$

Note: For noncarcinogenic effects: AT = ED.

TABLE C-53

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
ADOLESCENT TRESPASSER
NAS WHITING FIELD
MILTON, FLORIDA
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF $(mg/kg\text{-}day)^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] $(mg/kg\text{-}day)^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	4.3E-10	7.3E+00	3.1E-09	0.01	3.9E-10	8.0E+00	3.1E-09	6.2E-09
Benzo(a)pyrene	O	1310	ug/kg	5.1E-09	7.3E+00	3.7E-08	0.01	4.7E-09	8.0E+00	3.7E-08	7.5E-08
Benzo(b)fluoranthene	O	142	ug/kg	5.6E-10	7.3E+00	4.1E-09	0.01	5.1E-10	8.0E+00	4.1E-09	8.1E-09
Benzo(k)fluoranthene	O	10.5	ug/kg	4.1E-11	7.3E+00	3.0E-10	0.01	3.7E-11	8.0E+00	3.0E-10	6.0E-10
Chyrsene	O	1.4	ug/kg	5.5E-12	7.3E+00	4.0E-11	0.01	5.0E-12	8.0E+00	4.0E-11	8.0E-11
Dibenzo(a,h)anthracene	O	347	ug/kg	1.4E-09	7.3E+00	9.9E-09	0.01	1.2E-09	8.0E+00	9.9E-09	2.0E-08
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	3.3E-10	7.3E+00	2.4E-09	0.01	3.0E-10	8.0E+00	2.4E-09	4.9E-09
Aroclor-1254	O	365	ug/kg	1.4E-09	7.7E+00	1.1E-08	0.01	1.3E-09	8.6E+00	1.1E-08	2.2E-08
Arsenic	I	6.4	mg/kg	2.5E-08	1.5E+00	3.8E-08	0.001	2.3E-09	1.5E+00	3.4E-09	4.1E-08
				SUMMARY CANCER RISK		1E-07				7E-08	2E-07

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	6.6E-10	ND		0.01	6.0E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	1.5E-07	ND		0.01	1.4E-07	ND		
Benzo(a)pyrene	O	1310	ug/kg	1.8E-07	ND		0.01	1.6E-07	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	1.9E-07	ND		0.01	1.8E-07	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	1.4E-07	ND		0.01	1.3E-07	ND		
Chrysene	O	1400	ug/kg	1.9E-07	ND		0.01	1.7E-07	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	4.8E-08	ND		0.01	4.3E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	1.2E-07	ND		0.01	1.1E-07	ND		
Aroclor-1254	O	365	ug/kg	5.0E-08	2.0E-05	2.5E-03	0.01	4.6E-08	1.8E-05	2.5E-03	5.0E-03
Aluminum	I	24300	mg/kg	3.3E-03	1.0E+00	3.3E-03	0.001	3.0E-04	2.0E-01	1.5E-03	4.8E-03
Arsenic	I	6.4	mg/kg	8.8E-07	3.0E-04	2.9E-03	0.001	8.0E-08	2.9E-04	2.8E-04	3.2E-03
Iron	I	17500	mg/kg	2.4E-03	3.0E-01	8.0E-03	0.001	2.2E-04	6.0E-03	3.6E-02	4.4E-02
Vanadium	I	45.2	mg/kg	6.2E-06	7.0E-03	8.8E-04	0.001	5.6E-07	2.1E-04	2.7E-03	3.6E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	9.1E-05	3.0E-02	3.0E-03	0.01	8.3E-05	2.7E-02	3.1E-03	6.1E-03
				SUMMARY HAZARD INDEX		0.02				0.05	0.1

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

TABLE C-54

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 10

EXPOSURE PARAMETERS

PARAMETER	SYMBOL	VALUE	UNITS	SOURCE
CONCENTRATION SOIL	CS	chemical-specific	chemical-specific	
INGESTION RATE	IR	50	mg/day	USEPA, 1996
FRACTION INGESTED	FI	100%	unitless	Assumption
ADHERENCE FACTOR	AF	0.2	mg/cm^2-event	USEPA, 1992
ABSORPTION FRACTION	ABS	chemical-specific	unitless	Assumption
SURFACE AREA EXPOSED	SA	2,300	cm^2	USEPA, 1996
DOSE ABSORBED PER EVENT	DA_{event}	chemical-specific	mg/cm^2-event	USEPA, 1995
CONVERSION FACTOR	CF	1.00E-09	kg/ug	Organic conversion
CONVERSION FACTOR	CF	1.00E-06	kg/mg	Inorganic conversion
BODY WEIGHT	BW	70	kg	USEPA, 1991
EXPOSURE FREQUENCY	EF	250	days/year [1]	USEPA, 1992
EXPOSURE DURATION	ED	9	years	USEPA, 1992
AVERAGING TIME				
CANCER	AT	70	years	USEPA, 1991
NONCANCER	AT	9	years	USEPA, 1992

[1] Units for exposure frequency are events/year in the calculation of the dermally absorbed dose.
USEPA, 1991. *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"*;

USEPA, 1992. Region 6 Memorandum: Central Tendency and RME Exposure Parameters.
USEPA, 1995. Supplemental Guidance to RAGS : Region IV, Human Health Risk Assessment Bulletin No. 3.
USEPA, 1996. Exposure Factors Handbook, 1996.

EQUATIONS

CANCER RISK = INTAKE (mg/kg-day) x CANCER SLOPE FACTOR $(mg/kg\text{-}day)^{-1}$

HAZARD QUOTIENT = INTAKE (mg/kg-day) / REFERENCE DOSE (mg/kg-day)

$$INTAKE_{INGESTION} = \frac{CS \times IR \times FI \times CF \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

$$INTAKE_{DERMAL} = \frac{DA_{event} \times SA \times EF \times ED}{BW \times AT \times 365\ days/yr}$$

Where:

$$DA_{event} = CS \times AF \times ABS \times CF$$

Note: **For noncarcinogenic effects, AT = ED**

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TABLE C-54

DIRECT CONTACT WITH AND INCIDENTAL INGESTION OF SURFACE SOIL (CENTRAL TENDENCY)
OCCUPATIONAL WORKER
NAS WHITING FIELD
MILTON, FIELD
SITE 10

CARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION [1]	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL CSF (mg/kg-day)$^{-1}$	CANCER RISK INGESTION	DERMAL ABS [2]	INTAKE DERMAL (mg/kg-day)	DERMAL CSF [3] (mg/kg-day)$^{-1}$	CANCER RISK DERMAL	TOTAL CANCER RISK
Benzo(a)anthracene	O	109	ug/kg	6.9E-09	7.3E+00	5.0E-08	0.01	6.3E-10	8.0E+00	5.0E-09	5.5E-08
Benzo(a)pyrene	O	1310	ug/kg	8.2E-08	7.3E+00	6.0E-07	0.01	7.6E-09	8.0E+00	6.1E-08	6.6E-07
Benzo(b)fluoranthene	O	142	ug/kg	8.9E-09	7.3E+00	6.5E-08	0.01	8.2E-10	8.0E+00	6.6E-09	7.2E-08
Benzo(k)fluoranthene	O	10.5	ug/kg	6.6E-10	7.3E+00	4.8E-09	0.01	6.1E-11	8.0E+00	4.9E-10	5.3E-09
Chyrsene	O	1.4	ug/kg	8.8E-11	7.3E+00	6.4E-10	0.01	8.1E-12	8.0E+00	6.5E-11	7.1E-10
Dibenzo(a,h)anthracene	O	347	ug/kg	2.2E-08	7.3E+00	1.6E-07	0.01	2.0E-09	8.0E+00	1.6E-08	1.8E-07
Indeno(1,2,3-cd)pyrene	O	85.4	ug/kg	5.4E-09	7.3E+00	3.9E-08	0.01	4.9E-10	8.0E+00	4.0E-09	4.3E-08
Aroclor-1254	O	365	ug/kg	2.3E-08	7.7E+00	1.8E-07	0.01	2.1E-09	8.6E+00	1.8E-08	1.9E-07
Arsenic	I	6.4	mg/kg	4.0E-07	1.5E+00	6.0E-07	0.001	3.7E-09	1.5E+00	5.6E-09	6.1E-07
SUMMARY CANCER RISK						7E-07				7E-08	8E-07

[1] Toxicity equivalent factors applied to carcingoenic PAHs per USEPA Region IV guidance (USEPA, 1995)
[2] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[3] Calculated from oral CSFs.

NONCARCINOGENIC EFFECTS

COMPOUND	INORGANIC OR ORGANIC I/O	SOIL CONCENTRATION	UNITS	INTAKE INGESTION (mg/kg-day)	ORAL RfD (mg/kg-day)	HAZARD QUOTIENT INGESTION	DERMAL ABS [1]	INTAKE DERMAL (mg/kg-day)	DERMAL RfD [2] (mg/kg-day)	HAZARD QUOTIENT DERMAL	TOTAL HAZARD QUOTIENT
2-Hexanone	O	4.8	ug/kg	2.3E-09	ND		0.01	2.2E-10	ND		
Benzo(a)anthracene	O	1090	ug/kg	5.3E-07	ND		0.01	4.9E-08	ND		
Benzo(a)pyrene	O	1310	ug/kg	6.4E-07	ND		0.01	5.9E-08	ND		
Benzo(b)fluoranthene	O	1420	ug/kg	6.9E-07	ND		0.01	6.4E-08	ND		
Benzo(k)fluoranthene	O	1050	ug/kg	5.1E-07	ND		0.01	4.7E-08	ND		
Chrysene	O	1400	ug/kg	6.8E-07	ND		0.01	6.3E-08	ND		
Dibenzo(a,h)anthracene	O	347	ug/kg	1.7E-07	ND		0.01	1.6E-08	ND		
Indeno(1,2,3-cd)pyrene	O	854	ug/kg	4.2E-07	ND		0.01	3.8E-08	ND		
Aroclor-1254	O	365	ug/kg	1.8E-07	2.0E-05	8.9E-03	0.01	1.6E-08	1.8E-05	9.1E-04	9.8E-03
Aluminum	I	24300	mg/kg	1.2E-02	1.0E+00	1.2E-02	0.001	1.1E-04	2.0E-01	5.5E-04	1.2E-02
Arsenic	I	6.4	mg/kg	3.1E-06	3.0E-04	1.0E-02	0.001	2.9E-08	2.9E-04	9.9E-05	1.1E-02
Iron	I	17500	mg/kg	8.6E-03	3.0E-01	2.9E-02	0.001	7.9E-05	6.0E-03	1.3E-02	4.2E-02
Vanadium	I	45.2	mg/kg	2.2E-05	7.0E-03	3.2E-03	0.001	2.0E-07	2.1E-04	9.7E-04	4.1E-03
Total Petroleum Hydrocarbon	O	666000	ug/kg	3.3E-04	3.0E-02	1.1E-02	0.01	3.0E-05	2.7E-02	1.1E-03	1.2E-02
SUMMARY HAZARD INDEX						0.08				0.02	0.10

[1] USEPA Region IV guidance specifies absorption factors of 1% for organics and 0.1% for inorganics (November 1995).
[2] Calculated from oral RfDs.

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APPENDIX D

ECOLOGICAL RISK DATA

Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Log K_{ow}	[b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
		Bioaccumulation Factor [a]				
VOLATILES						
2-Hexanone	NA		NA	NA	NA	NA
SEMIVOLATILES						
Acenaphthene	3.9	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Anthracene	4.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(a)anthracene	5.7	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(a)pyrene	6.0	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(b)fluoranthene	6.1	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(g,h,i)perylene	NA	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(k)fluoranthene	6.1	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Butylbenzylphthalate	4.9	4.4	5.0E-02	2.2E-02	1.5E-01	NA
Carbazole	3.76 [g]	3.7	5.0E-02	5.6E-02	1.5E-01	NA
Chrysene	5.7	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Dibenzo(a,h)anthracene	6.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Dibenzofuran	4.1	4.1	5.0E-02	3.3E-02	1.5E-01	NA
1,4-Dichlorobenzene	3.5	3.9	5.0E-02	4.3E-02	1.5E-01	NA
Diethylphthalate	3.2	4.4	5.0E-02	2.2E-02	1.5E-01	NA
bis(2-Ethylhexyl)phthalate	5.1	4.4	5.0E-02	2.2E-02	1.5E-01	NA
Fluoranthene	4.95	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Fluorene	4.2	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Indeno(1,2,3-cd)pyrene	6.6	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Phenanthrene	4.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Pyrene	5.3	5.4	5.0E-02	5.9E-03	3.8E-01	NA
1,2,4-Trichlorobenzene	4.3	3.9	5.0E-02	4.3E-02	1.5E-01	NA
PESTICIDES/PCBs						
Aroclor-1254	7.1 [h]	6	5.8E+00 [i]	1.2E-01 [i]	3.8E+00 [j]	3.2E-01 [i]

Table D - 1

Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Log K_{ow} [b]		Bioaccumulation Factor [a] Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
Aroclor-1260	7.1 [h]	6	5.8E+00 [k]	1.2E-01 [i]	3.8E+00 [j]	3.2E-01 [l]
INORGANICS						
Aluminum	NA		7.5E-02 [m]	8.0E-04 [n]	7.5E-02 [o]	NA
Antimony	NA		5.0E-02 [m]	4.0E-02 [n]	5.0E-02 [o]	NA
Cadmium	NA		1.1E+01	3.3E+01 [p]	2.1E+00 [o]	3.8E-01 [q]
Iron	NA		NA	NA	NA	NA
Manganese	NA		2.0E-02 [m]	5.0E-02 [n]	2.0E-02 [o]	NA
Vanadium	NA		1.2E-01 [m]	1.1E-03 [n]	1.2E-01 [o]	NA
Zinc	NA		1.8E+00 [k]	6.1E-01 [r]	2.1E+00 [o]	NA
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS						
TRPH	NA		NA	NA	NA	NA

NOTES:

[a] Units for bioaccumulation factors (BAFs) are mg/kg (fresh) tissue weight over mg/kg (dry) soil weight for invertebrates and plants. The BAF units for small mammals and small birds are mg/kg (fresh) tissue weight over mg/kg (fresh) food weight. No BAFs were calculated for volatile organic compounds because available evidence suggests that these analytes do not bioaccumulate (Suter, 1993, Maughan, 1993).

[b] Log K_{ow} values are from the Superfund Chemical Data Matrix (USEPA, 1993), unless otherwise noted. Average Log K_{ow} for classes of semivolatiles are presented in the second log K_{ow} column. When available, chemical class log K_{ow} averages are used instead of chemical specific log K_{ow} to calculate BAF values.

[c] The value is an average BAF for semivolatiles measured in earthworms (Beyer, 1990) , unless otherwise noted. Dry weight values were converted to wet weight assuming earthworm are 80% water $(BAF_{weight\ weight} = BAF_{dry\ weight}/ 0.2)$.

[d] Plant BAF were calculated using the following equation presented by Travis and Arms (1988) unless otherwise noted: log (Plant Bioaccumulation Factor)=1.588-0.578 (log K_{ow}). The calculated plant BAF value was converted from dry weight to wet weight

Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Log K_{ow}	Bioaccumulation Factor [a] [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
VOLATILES						
2-Hexanone	NA		NA	NA	NA	NA
SEMIVOLATILES						
Acenaphthene	3.9	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Anthracene	4.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(a)anthracene	5.7	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(a)pyrene	6.0	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(b)fluoranthene	6.1	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(g,h,i)perylene	NA	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Benzo(k)fluoranthene	6.1	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Butylbenzylphthalate	4.9	4.4	5.0E-02	2.2E-02	1.5E-01	NA
Carbazole	3.76 [g]	3.7	5.0E-02	5.6E-02	1.5E-01	NA
Chrysene	5.7	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Dibenzo(a,h)anthracene	6.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Dibenzofuran	4.1	4.1	5.0E-02	3.3E-02	1.5E-01	NA
1,4-Dichlorobenzene	3.5	3.9	5.0E-02	4.3E-02	1.5E-01	NA
Diethylphthalate	3.2	4.4	5.0E-02	2.2E-02	1.5E-01	NA
bis(2-Ethylhexyl)phthalate	5.1	4.4	5.0E-02	2.2E-02	1.5E-01	NA
Fluoranthene	4.95	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Fluorene	4.2	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Indeno(1,2,3-cd)pyrene	6.6	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Phenanthrene	4.5	5.4	5.0E-02	5.9E-03	3.8E-01	NA
Pyrene	5.3	5.4	5.0E-02	5.9E-03	3.8E-01	NA
1,2,4-Trichlorobenzene	4.3	3.9	5.0E-02	4.3E-02	1.5E-01	NA

Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Log K_{ow}	[b]	Bioaccumulation Factor [a] Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]
PESTICIDES/PCBs						
Aroclor-1254	7.1 [h]	6	5.8E+00 [i]	1.2E-01 [i]	3.8E+00 [j]	3.2E-01 [i]
Aroclor-1260	7.1 [h]	6	5.8E+00 [k]	1.2E-01 [i]	3.8E+00 [j]	3.2E-01 [l]
INORGANICS						
Aluminum	NA		7.5E-02 [m]	8.0E-04 [n]	7.5E-02 [o]	NA
Antimony	NA		5.0E-02 [m]	4.0E-02 [n]	5.0E-02 [o]	NA
Cadmium	NA		1.1E+01	3.3E+01 [p]	2.1E+00 [o]	3.8E-01 [q]
Iron	NA		NA	NA	NA	NA
Manganese	NA		2.0E-02 [m]	5.0E-02 [n]	2.0E-02 [o]	NA
Vanadium	NA		1.2E-01 [m]	1.1E-03 [n]	1.2E-01 [o]	NA
Zinc	NA		1.8E+00 [k]	6.1E-01 [r]	2.1E+00 [o]	NA
TOTAL RECOVERABLE PETROLEUM HYDROCARBONS						
TRPH	NA		NA	NA	NA	NA

NOTES:

[a] Units for bioaccumulation factors (BAFs) are mg/kg (fresh) tissue weight over mg/kg (dry) soil weight for invertebrates and plants. The BAF units for small mammals and small birds are mg/kg (fresh) tissue weight over mg/kg (fresh) food weight. No BAFs were calculated for volatile organic compounds because available evidence suggests that these analytes do not bioaccumulate (Suter, 1993, Maughan, 1993).

[b] Log K_{ow} values are from the Superfund Chemical Data Matrix (USEPA, 1993), unless otherwise noted. Average Log K_{ow} for classes of semivolatiles are presented in the second log K_{ow} column. When available, chemical class log K_{ow} averages are used instead of chemical specific log K_{ow} to calculate BAF values.

[c] The value is an average BAF for semivolatiles measured in earthworms (Beyer, 1990) , unless otherwise noted. Dry weight values were converted to wet weight assuming earthworm are 80% water ($BAF_{weight\ weight} = BAF_{dry\ weight} / 0.2$).

Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

[d] Plant BAF were calculated using the following equation presented by Travis and Arms (1988) unless otherwise noted:
log (Plant Bioaccumulation Factor)=1.588-0.578 (log K_{ow}). The calculated plant BAF value was converted from dry weight to wet weight by dividing the BAF by a factor of 0.2 (assuming 80% water content of plants) ($BAF_{weight\ weight}$ = $BAF_{dry\ weight}$/ 0.2).

[e] Mammalian BAFs were calculated using the following equation from Travis and Arms (1988), unless otherwise noted:
log BTF (biotransfer factor) = Log K_{ow} - 7.6.
To convert from BTF to BAF, the calculated log BTF is first transformed to base 10 than multiplied by the average ingestion rates for nonlactating and lactating test animals (12 kg/day). BAFs are convert from dry to wet feed weight by divided the BAF by a factor of 0.2 ($BAF_{wet\ weight}$ = BTF *12 mg/day/0.2). There is an uncertainty involved in using this equation for PAHs because the study by Travis and Arms (1988) did not use PAHs in the regression analysis.
For semivolatile analytes with Log K_{ow} less than 5 (log K_{ow} < 5) the BAF was assigned a minimal value of 0.15.
When no literature values for pesticides and PCBs were available, the BAF was calculated regardless of the Log K_{ow}, due to the tendency of these lipophylic compounds to bioaccumulate.

[f] Bioaccumulation data are generally lacking for avians. Therefore, there is uncertainty associated with estimating body-dose for birds without considering what chemicals may have bioacumulated in prey-item tissue.

[g] Hansch and Leo (1976)

[h] USEPA (1990) - Basics of Pump-and-Treat Ground-Water Remediation Technology

[i] Value for Aroclor 1260 is used a surrogate.

[j] BAF calculated from discussion in Eisler (1986) stating that Aroclor 1254 residues in subcutaneous fat of adult minks were up to 38

[k] BAF for earthworms from Diercxsens et al. (1985).

[l] BAF calculated from discussion in Eisler, 1986. Kestrels fed 33 mg PCB/kg diet for 62-69 days accumulated 107 mg PCB/kg lipid weight in muscle. Assuming muscle is 10% lipid content, the muscle concentration is about 10.7 mg/kg.

[m] Prey-specific value is not available. The value shown is the small mammal BAF for this chemical.

[n] Value from Baes et al. (1984) for leafy portions of plants multiplied by 0.2 to represent 80% water composition of plants.

[o] Value derived from BTFs, presented in Baes et al. (1984) for uptake into cattle. BTF converted to BAF by multiplying by food ingestion rate of 50 kg/day wet weight.

[p] Plant value for cadmium from Levine et al., 1989.

[q] Based on accumulation of cadmium in kidneys of European quail in Pimentel et al. (1984).

[r] Median of values reported from Levine et al. (1989).

Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

Notes:

Log Kow = Logarithm transformation of the octanol/water partitioning coefficient
NA = not available.
PCBs = polychlorinated biphenyls.
BAF = bioaccumulation factor.
mg/kg = milligrams per kilogram.
BTF = biotransfer factor.
PAH = polynuclear aromatic hydrocarbons.
> = greater than.
< = less than.
% = percent.

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Table D - 1
Summary of Bioaccumulation Data

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Bioaccumulation Factor [a]				
	Log K_{ow} [b]	Invertebrate [c]	Plant [d]	Mammal [e]	Bird [f]

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Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV[1]	LOAEL	NOAEL	RTV[2]	
Volatile Organic Compounds											
2-Hexanone (2-Butanone	Rat	Oral LD_{50}	NR	Mortality	2,737		547				RTECS, 1994
is used as a surrogate)	Mouse	Oral LD_{50}	NR	Mortality	4,050						RTECS, 1994
	Rat	Oral (subchronic)	13 weeks	NOAEL for neurological effects					173	173	ATSDR, 1991h
Semivolatile Organic Compounds											
Acenaphthene	Mouse	Oral (chronic)	90 days	Liver weight increase					175		IRIS, 1993
	Rat	Oral (chronic)	32 days	Physiological changes				2,000			USEPA, 1984d
Anthracene	Mouse	Oral LD_{50}	NR	Mortality	17,000		3,400				RTECS, 1993
	Rodents	Oral (chronic)	NR	Carcinogenicity				3,300			Eisler, R., 1987a
	Mouse	Oral (chronic)	90 days	Clinical and pathological effects					1,000		IRIS, 1993
Benzo(a)anthracene	Rodents	Oral (chronic)	HR	Carcinogenicity				2			Eisler, R., 1987b
Benzo(a)pyrene	Rat	Oral (chronic)	Pregnancy	Sterility in offspring				40			USEPA, 1984c
	Rat	Oral (chronic)	3.5 months	Reproductive				50			USEPA, 1984c
	Mouse	Oral	Multigenerational	Decreased fertility of F1 progeny; decreased F2 litter size.				[3] 10		10	MacKenzie, et al. 1981
	Mouse	Oral (subchronic)	6 months	Mortality		[3] 120	12				USEPA, 1984e
Benzo(b)fluoranthene and Benzo(k)fluoranthene	Rodents	Oral (chronic)	NR	Carcinogenicity				40			Eisler, R., 1987b
Benzo(g,h,i)perylene	Rodents	Oral (chronic)	NR	Carcinogenicity				99			Eisler, R., 1987b
Butylbenzylphthalate	Rat	Oral LD_{50}	NR	Mortality	2,330		466				RTECS, 1993
	Rat	Oral	NR	Reproductive effects				21,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				16,400			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				16,400			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				4,900		490	RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	4,170						RTECS, 1993
	Guniea Pig	Oral LD_{50}	NR	Mortality	13,750						RTECS, 1993
Carbazole	Rat	Oral LD_{50}		Mortality	500		100				USEPA, 1986
Chrysene	Rodents	Oral (chronic)	NR	Carcinogenicity				99			Eisler, R., 1987b
Dibenzo(a,h)anthracene	Rat	Oral (chronic)	3.5 months	Reproductive				50			USEPA, 1984e
Dibenzofuran	Rodents	Single oral dose		LC 20		500					ATSDR, 1991e
	Rodents	Oral (chronic)	13 weeks	LC 10		125	12.5				ATSDR, 1991e
	Mouse	Oral (chronic)	103 weeks	Multinuclear hepatocytes					60	60	ATSDR, 1991e
1,4-Dichlorobenzene	Rat	LD_{50} gavage, oil	14 day	Mortality	3800		760				ATSDR, 1992g
	Mouse	Oral		Systems,hepatoce llular degeneration					300		ATSDR, 1992g
Diethylphthalate	Mouse	Oral (subchronic)	Multigenerational	Decrease in F1 litter size				3,250		325	ATSDR, 1993a

Table D - 2
Ingestion Toxicity Information for Wildlife

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Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	
	Rat	Oral LD_{50}		Mortality	8,600		1,720				NIOSH, 1985
bis(2-Ethylhexyl)phthalate	Rat	Oral LD_{50}	NR	Mortality	30,600						RTECS, 1993
	Rat	Oral	NR	Reproductive effects				7,140			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				35		3.5	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				6,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				17,200			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				10,000			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				9,766			RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	30,000						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				78,880			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				4,200			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				50			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,000			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				2,040			RTECS, 1993
	Rabbit	Oral LD_{50}	NR	Mortality	34,000						RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	26,000						RTECS, 1993
	Guinea pig	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				20,000			RTECS, 1993
	Mammal	Oral	NR	Reproductive effects				509,000			RTECS, 1993
	Mouse	Oral LD_{50}		Mortality	800		160				RTECS, 1993
	Mouse	Oral (subchronic)	13 weeks	Renal effects				125			RTECS, 1993
Fluoranthene	Rat	Oral LD_{50}	NR	Mortality	2,000		400				RTECS, 1994
	Mouse	Oral (subchronic)	90 days	Nephropathy; clinical and pathological effects				250	125		IRIS, 1993
Fluorene	Mouse	Oral (chronic)	13 weeks	Hematological changes				250	125		IRIS, 1993
Indeno(1,2,3-cd)pyrene	Rodents	Oral (chronic)	NR	Carcinogenicity				72			Eisler, R., 1987b
Phenanthrene	Mouse	Oral LD_{50}	NR	Mortality	700		140				RTECS, 1994
	Mouse	Oral (subchronic)	6 months	Increased liver weight				120			IRIS, 1993
Pyrene	Rat	Oral LD_{50}	NR	Mortality	2,700						RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	800		160				RTECS, 1993
	Mouse	Oral (chronic)	13 weeks	Renal effects				125	75		IRIS, 1993
1,2,4-Trichlorobenzene	Rat	Oral LD_{50}	Single oral dose	Death	3,800						ATSDR, 1991i
	Mouse	Oral	NR	Hepatocellular degeneration, nephropathy, tubular degeneration				300			ATSDR, 1991i
	Rat	Oral LD_{50}	NR	Mortality	756		151.2				Sax, N.I, 1984
	Mouse	Oral LD_{50}	NR	Mortality	766						Sax, N.I, 1984

Pesticides/PCBs

Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	
Aroclor 1254	Mouse	Oral	NR	Reproductive				1.53		0.153	USEPA, 1993b
	Chicken	Oral (chronic)	NR	Embryonic mortality				0.9			USEPA, 1976
	Rock dove	Oral (chronic)	NR	Parental incubation behavior				0.9		0.09	Peakall, D.B., et al., 1973
	American kestrel	Oral (chronic)	69 days	Reduced sperm concentration				9		0.9	Eisler, R., 1986,
	Mink	Oral dose	160 days	Reproductive				0.096		0.0096	USEPA, 1993b
	Mink	Oral	NR	Kit growth				0.15			USEPA, 1993b
	Mink	Oral	12.5 days	Reproductive				0.375			USEPA, 1993b
	Chicken	Oral	39 weeks	Egg production and fertility				2.44			USEPA, 1993b
	Chicken	Oral	NR	Egg production and hatchability				9.8			USEPA, 1993b
	Chicken	Maternal diet	NR	Chick growth				0.98			USEPA, 1993b
	Pheasant	Oral	16 weeks	Egg hatchability				1.8			USEPA, 1993b
Aroclor 1260	Rat	Oral LD_{50}	NR	Mortality	1,315						RTECS, 1993
	Rat	Oral LD_{50}	NR	Mortality	500		100				Eisler, R., 1986,
	Rat	Oral LD_{50}	NR	Mortality	1,300						Eisler, R., 1986,
	Rat	Oral	NR	Reproductive effects				1,674			RTECS, 1993
	Rat	Oral (chronic)	2 generations	Reduced litter size				7.6			USEPA, 1985b
	Rat	Oral (subchronic)	9 weeks	Fetal mortality; maternal toxicity				6.4		0.64	ATSDR, 1987b
	Mouse	Oral	NR	Reproductive effects				74			RTECS, 1993
	Mink	Oral LD_{50}		Mortality	4,000						Eisler, R., 1986,
	Mink	Oral LD_{50}		Mortality	3,000						Eisler, R., 1986,
	Mink	Oral LD_{50}		Mortality	750		150				Eisler, R., 1986,
	Mink	Oral (subchronic)	4 months	Impaired reproduction				0.0075		0.0008	Newell, A.J., et al., 1987
	Bobwhite	Oral LD_{50}	8 days	Mortality	[4] 80		16				Eisler, R., 1986,
	Mallard	Oral LD_{50}	8 days	Mortality	111						Eisler, R., 1986,
Inorganic Analytes											
Aluminum	Mouse	Oral (chronic)	2-3 generations	Reduced body weight gain of newborns				425		42.5	NIOSH, 1985
	Rat	Oral (subchronic)	15 days	Reduced growth				100			Bernuzzi, V., et al., 1989
	Rat	Oral LD_{50}	NR	Mortality	3,700		740				Sax, N.I, 1984
Antimony	Rat	Oral	Mortality		16,714		3,343				ATSDR, 1991a
	Rat	Oral (chronic)	NR	Longevity; blood glucose; cholesterol				0.35(water)			IRIS, 1993
	Rat	Oral (subchronic)	24 weeks	Decreased RBC, swelling of hepatic cords				41.8			ATSDR, 1991a
Cadmium	Rat	Oral	NR	Reproductive effects				155			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				220			RTECS, 1993
	Rat	Oral	NR	Reproductive effects				21.5		2.15	RTECS, 1993
	Rat	Oral	NR	Reproductive effects				23			RTECS, 1993
	Rat	Oral LD_{50}		Mortality	250						Eisler, R., 1985a

Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
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Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	
	Rat	Oral LD_{50}	NR	Mortality	225						RTECS, 1993
	Mouse	Oral LD_{50}	NR	Mortality	890						RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				448			RTECS, 1993
	Mouse	Oral	NR	Reproductive effects				1,700			RTECS, 1993
	Guinea pig	Oral LD_{50}	NR	Mortality	$\boxed{150}$		$\boxed{30}$				Eisler, R., 1985a
	Mallard	Oral (subchronic)	90 days	Egg production suppressed				$\boxed{10}$		$\boxed{1}$	Eisler, R., 1985a
Iron	Guinea pig	Oral LD_{50}	NR	Mortality	$\boxed{1,200}$		$\boxed{240}$				Sax, N.I, 1984
Manganese	Mouse	Oral (subchronic)	90 days	Delayed growth of testes				$\boxed{140}$		$\boxed{14}$	ATSDR, 1990d
	Mouse	Oral (chronic)	103 weeks	Mortality	4,050						ATSDR, 1990d
	Rat	Oral LD_{50}	NR	Mortality	410						ATSDR, 1990d
	Rat	Oral LD_{50}	20 days	Mortality	$\boxed{225}$		$\boxed{45}$				ATSDR, 1990d
	Rat	Oral (subchronic)	20 days	Decreased litter weight during gestation					620		ATSDR, 1990d
	Rat	Oral (chronic)	103 weeks	Mortality	930						ATSDR, 1990d
	Guinea pig	Oral LD_{50}	NR	Mortality	400						USEPA, 1984a
	Monkey	Oral (chronic)	18 months	Weakness, rigidity				25			ATSDR, 1990d
	Rodents/livestock	Oral (subchronic)	10 days - 2 month	Decreased growth rate				100			Cunningham, et al., 1966
	Mouse	Oral (subchronic)	180 days	Mortality		2,300					Gianuteos, G., et al,, 1982
Vanadium	Japanese quail	Oral LD_{50}	5 days	Mortality	$\boxed{96}$		$\boxed{19.2}$				Hill, E.F., et al., 1986
	Mouse	Gavage LD_{50}	One time	Mortality	$\boxed{31}$		$\boxed{6.2}$				ATSDR, 1990g
	Rat	Oral (subchronic)	2 months	Hypertension				15			Susio, D., et al., 1986
	Rat	Oral (subchronic)	35 days	Development effects					$\boxed{8.4}$	$\boxed{8.4}$	Domingo, J.L., et al., 1986
	Chicken	Oral (subchronic)	6 weeks	Decrease in egglaying				[6] $\boxed{11}$		$\boxed{1.1}$	Berg, L.R., et al., 1963
Zinc	Rat	Oral LD_{50}		Mortality	$\boxed{2,510}$		$\boxed{502}$				RTECS, 1993
	Rat	Oral	Gestation	Fetal resorptions in 4 to 20% of population				$\boxed{200}$		$\boxed{20}$	Schlicker, S.A., et al., 1968
	Ferret	Oral	3-13 days	Mortality and gastrointestinal effects		390					Straube, E.F., et al., 1980
	Rat	Oral (subchronic)	NR	Kidney toxicity				160			Llobet, J.M. et al., 1988
Total Recoverable Petroleum Hydrocarbons											
TRPH	NA	NA	NA	NA							

[1] *Selected lethal RTVs are boxed. The lethal RTVs correspond to the NOAEL when available. When an NOAEL is not available, then the RTV value is calculated by appling a ten-fold application factor to the LOAEL or a five-fold application factor to the Oral LD_{50}.*

[2] Selected sublethal RTVs are boxed. The sublethal RTV corresponds to the NOAEL when available. When an NOAEL is not available, the sublethal RTV value is calculated by appling a ten-fold application factor to the sublethal LOAEL.

Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

[3] Value for benzo(a)pyrene chosen as a surrogate for all PAHs. Chemical-specific toxicity studies for ecologically significant endpoints are lacking for other PAHs.
Sublethal RTV for benzo(a)pyrene is equal to the LOAEL value because the toxicity test is multi-generational.

[4] Converted to dose per kilogram body weight by multiplying the reported value by ingestion rate and dividing by body weight. Body weights for birds obtained from Dunning, 1984.
Ingestion rates were calculated using the following regression equation (for all birds) from USEPA , 1993a): Food Ingestion (kg/day) = 0.00582 * Body Weight$^{0.651}$ (kg).
Ingestion rates for the chicken from NRC, 1984.

[5] Converted from 30 ppm to 11 mg/kg BW-day using standard default parameters USEPA, 1988b.

Notes: mg/kg = milligrams per kilogram.
RTV = reference toxicity value.
BW = Body weight.
LD_{50} = dose resulting in 50% mortality in test population.
LOAEL = lowest observed adverse effect level.
NOAEL = no observed adverse effect level.
NR = not reported.
PCBs = polychlorinated biphenyls.
PAH = polynuclear aromatic hydrocarbons.
$LC_{20,10}$ = lethal concentration for 20% or 10% of the population.
> = greater than.
% = percent.
gest = gestation.

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Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Registry of Toxic Effects of Chemical Substances (RTECS), 1993-1995, On-line database search.

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Table D - 2
Ingestion Toxicity Information for Wildlife

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Test Species	Test Type	Duration	Effect	Lethal RTV mg/kg-BW-day			Sublethal RTV mg/kg-BW-day			References
					Oral LD_{50}	LOAEL	RTV [1]	LOAEL	NOAEL	RTV [2]	

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Table D - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kg BW/day)

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal
Volatile Organic Compounds								
2-Hexanone	547	173	NA	NA	547	173	NA	NA
Semivolatile Organic Compounds								
Acenaphthene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Anthracene	3,400	10 [f]	NA	NA	3,400	10 [f]	NA	NA
Benzo(a)anthracene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(a)pyrene	12	10	NA	NA	12	10 [f]	NA	NA
Benzo(b)fluoranthene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(g,h,i)perylene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Benzo(k)fluoranthene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Butylbenzylphthalate	466	490	NA	NA	466	490	NA	NA
Carbazole	100	NA	NA	NA	100	NA	NA	NA
Chrysene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Dibenz(ah)anthracene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Dibenzofuran	12.5	60	NA	NA	12.5	60	NA	NA
1,4-Dichlorobenzene	760	NA	NA	NA	760	NA	NA	NA
Diethylphthalate	1,720	325	NA	NA	1,720	325	NA	NA
bis(2-Ethylhexyl)phthalate	160	3.5	NA	NA	160	3.5	NA	NA
Fluoranthene	400	10 [f]	NA	NA	400	10 [f]	NA	NA
Fluorene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Indeno(1,2,3-cd)pyrene	12 [f]	10 [f]	NA	NA	12 [f]	10 [f]	NA	NA
Phenanthrene	140	10 [f]	NA	NA	140	10 [f]	NA	NA
Pyrene	160	10 [f]	NA	NA	160	10 [f]	NA	NA
1,2,4-Trichlorobenzene	151	NA	NA	NA	151	NA	NA	NA
Pesticides/PCBs								
Aroclor-1254	100 [g]	0.153	16 [g]	0.09	150 [g]	0.0096	16 [g]	0.9
Aroclor-1260	100	0.64	16	0.9 [h]	150	0.00075	16	0.9 [h]
Inorganic Compounds								
Aluminum	740	42.5	NA	NA	740	42.5	NA	NA
Antimony	3,343	NA	NA	NA	3,343	NA	NA	NA
Cadmium	30	2.15	NA	1	30	2.15	NA	1
Iron	240	NA	NA	NA	240	NA	NA	NA
Manganese	45	14	NA	NA	45	14	NA	NA
Vanadium	6.2	8.4	19.2	1.1	6.2	8.4	19.2	1.1
Zinc	502	20	NA	NA	502	20	NA	NA
Total Recoverable Petroleum Hydrocarbons								
TRPH	NA	NA	NA	NA	NA	NA	NA	NA

Table D - 3
RTVs Selected for Ecological Risk Assessment [a]
Units (mg/kg BW/day)

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Analyte	Small Mammal [b]		Small Bird [c]		Predatory Mammal [d]		Predatory Bird [e]	
	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal	Lethal	Sublethal

Notes:
[a] Lethal RTVs correspond to the boxed lethal RTV presented in Table D-2. Lethal RTVs correspond to the lowest NOAEL, or one-tenth of the lowest LOAEL, or one-fifth of the lowest LD_{50}. Sublethal RTVs correspond to the boxed RTV.
When an NOAEL value is not available, one-tenth of the sublethal LOAEL is used as a surrogate.
[b] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for cotton mouse and short-tailed shrew.
[c] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the Eastern meadowlark.
[d] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the red fox.
When no data were available, the small mammal value is used as a surrogate.
[e] These RTVs represent chemical concentrations that are not anticipated to result in adverse effects for the great-horned owl. When no data were available, the small bird value is used as a surrogate.
[f] The value for benzo(a)pyrene was used as a surrogate.
[g] The value for Aroclor -1260 was used as a surrogate.
[h] The value for Aroclor - 1254 was used as a surrogate.

Notes:
NA = Not available.
RTV = reference toxicity value.
mg/kg = milligrams per kilogram.
LD_{50} = dose resulting in 50% mortality in test population.
LOAEL = Lowest Observed Adverse Effect Level.
NOAEL = No observed adverse effect level.
PCBs = polychlorinated biphenyls.

Table D - 4
Summary of Toxicity Data for Plant Receptors

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Site 9 ECPCs	Reference	RTV in soil [a] (mg/kg)
SEMI-VOLATILE ORGANICS		
1,4-Dichlorobenzene		NA
1,2,4-Trichlorobenzene		NA
INORGANICS		
Aluminum	Will and Suter, 1994	50
Antimony	Will and Suter, 1994	5
Vanadium	Will and Suter, 1994	2
Total Recoverable Petroleum Hydrocarbons		
TRPH		NA

Notes:

[a] RTVs in soil are equal to chemical concentrations in soil that are not expected to result in adverse effects to plants.

NA = Not Available.

mg/kg = milligrams per kilogram.

RTV = reference toxicity value.

References:

Will, M.E., and G.W. Suter. 1994. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Terrestrial Plants. 1994 Rev. (September). Environmental Sciences Division. Oak Ridge, Tennessee: Oak Ridge National Laboratory.

Table D - 5
Summary of Toxicity Data for Terrestrial Invertebrates

Remedial Investigation and Feasibility Study
Sites 9 and 10
Naval Air Station Whiting Field
Milton, Florida

Site 9 ECPCs	Test Type	Test Duration	Test Species	Chemical Concentration (mg/kg)	Effect	RTV (mg/kg)	Reference
SEMIVOLATILE ORGANIC COMPOUNDS							
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
INORGANIC ANALYTES							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA
Total Recoverabled Petroleum Hydrocarbons							
TRPH	NA	NA	NA	NA	NA	NA	NA

Notes:
RTV = reference toxicity value
NA = not available

Table D-6
Exposure Parameters and Assumptions for Terrestrial Receptors [a]
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

Representative Wildlife Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Small Birds	Soil	Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Eastern meadowlark	(Small insect. bird)	75%	20%	0%	0%	5%	5	1	4.00E-01	0.0119	0.087
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	260	1	8.00E-03	0.24	4.69
Great horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	1.33E-01	0.078	1.5
Mourning dove	(Small herb. bird)	1%	94%	0%	0%	5%	5	1	4.00E-01	0.015	0.13

NOTES:

SITE AREA: 2.0 acres

[a] Documentation of exposure parameters presented in: Table 7-7
[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area). ED is assumed to be 1 for this risk assessment.
[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0)).

Table D-7
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	REASONABLE MAXIMUM EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
1,4-Dichlorobenzene	1.1E-01	5.0E-02	5.5E-03	4.3E-02	4.7E-03	1.5E-01	NA
1,2,4-Trichlorobenzene	1.2E-01	5.0E-02	6.0E-03	4.3E-02	5.2E-03	1.5E-01	NA
Aluminum	2.9E+04	7.5E-02	2.2E+03	8.0E-04	2.3E+01	7.5E-02	NA
Antimony	8.3E+00	5.0E-02	4.2E-01	4.0E-02	3.3E-01	5.0E-02	NA
Vanadium	7.7E+01	1.2E-01	9.2E+00	1.1E-03	8.4E-02	1.2E-01	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix D, Table D-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant.

Table D-7
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Great horned owl*	*Mourning dove*
1,4-Dichlorobenzene	9.5E-04	2.2E-03	5.8E-04	2.4E-06	1.7E-05	4.6E-04
1,2,4-Trichlorobenzene	1.0E-03	2.4E-03	6.3E-04	2.6E-06	1.9E-05	5.0E-04
Aluminum	1.1E+02	6.6E+02	1.7E+02	5.9E-01	3.2E+00	7.0E+01
Antimony	6.9E-02	1.7E-01	4.3E-02	1.6E-04	8.1E-04	3.4E-02
Vanadium	3.5E-01	2.1E+00	5.9E-01	1.9E-03	1.1E-02	1.8E-01

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table D-8
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Cotton mouse*			*Short-tailed shrew*			*Eastern meadowlark*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	9.5E-04	7.6E+02	1.3E-06	2.2E-03	7.6E+02	2.9E-06	5.8E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	1.0E-03	1.5E+02	6.9E-06	2.4E-03	1.5E+02	1.6E-05	6.3E-04	NA	0.0E+00
Aluminum	1.1E+02	7.4E+02	1.5E-01	6.6E+02	7.4E+02	8.9E-01	1.7E+02	NA	0.0E+00
Antimony	6.9E-02	3.3E+03	2.1E-05	1.7E-01	3.3E+03	5.0E-05	4.3E-02	NA	0.0E+00
Vanadium	3.5E-01	6.2E+00	5.6E-02	2.1E+00	6.2E+00	3.4E-01	5.9E-01	1.9E+01	3.1E-02
SUMMARY HAZARD INDEX			2.1E-01			1.2E+00			3.1E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-8
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Red fox*			*Great horned owl*			*Mourning dove*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	2.4E-06	7.6E+02	3.1E-09	1.7E-05	NA	0.0E+00	4.6E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	2.6E-06	1.5E+02	1.7E-08	1.9E-05	NA	0.0E+00	5.0E-04	NA	0.0E+00
Aluminum	5.9E-01	7.4E+02	8.0E-04	3.2E+00	NA	0.0E+00	7.0E+01	NA	0.0E+00
Antimony	1.6E-04	3.3E+03	4.8E-08	8.1E-04	NA	0.0E+00	3.4E-02	NA	0.0E+00
Vanadium	1.9E-03	6.2E+00	3.1E-04	1.1E-02	1.9E+01	5.8E-04	1.8E-01	1.9E+01	9.6E-03
SUMMARY HAZARD INDEX			1.1E-03			5.8E-04			9.6E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-9
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	9.5E-04	NA	0.0E+00	2.2E-03	NA	0.0E+00	5.8E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	1.0E-03	NA	0.0E+00	2.4E-03	NA	0.0E+00	6.3E-04	NA	0.0E+00
Aluminum	1.1E+02	4.3E+01	2.7E+00	6.6E+02	4.3E+01	1.5E+01	1.7E+02	NA	0.0E+00
Antimony	6.9E-02	NA	0.0E+00	1.7E-01	NA	0.0E+00	4.3E-02	NA	0.0E+00
Vanadium	3.5E-01	8.4E+00	4.2E-02	2.1E+00	8.4E+00	2.5E-01	5.9E-01	1.1E+00	5.3E-01
SUMMARY HAZARD INDEX			2.7E+00			1.6E+01			5.3E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-9
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	2.4E-06	NA	0.0E+00	1.7E-05	NA	0.0E+00	4.6E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	2.6E-06	NA	0.0E+00	1.9E-05	NA	0.0E+00	5.0E-04	NA	0.0E+00
Aluminum	5.9E-01	4.3E+01	1.4E-02	3.2E+00	NA	0.0E+00	7.0E+01	NA	0.0E+00
Antimony	1.6E-04	NA	0.0E+00	8.1E-04	NA	0.0E+00	3.4E-02	NA	0.0E+00
Vanadium	1.9E-03	8.4E+00	2.3E-04	1.1E-02	1.1E+00	1.0E-02	1.8E-01	1.1E+00	1.7E-01
SUMMARY HAZARD INDEX			1.4E-02			1.0E-02			1.7E-01

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-10
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	CENTRAL TENDENCY EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
1,4-Dichlorobenzene	1.1E-01	5.0E-02	5.5E-03	4.3E-02	4.7E-03	1.5E-01	NA
1,2,4-Trichlorobenzene	1.2E-01	5.0E-02	6.0E-03	4.3E-02	5.2E-03	1.5E-01	NA
Aluminum	2.0E+04	7.5E-02	1.5E+03	8.0E-04	1.6E+01	7.5E-02	NA
Antimony	6.5E+00	5.0E-02	3.3E-01	4.0E-02	2.6E-01	5.0E-02	NA
Vanadium	4.7E+01	1.2E-01	5.6E+00	1.1E-03	5.1E-02	1.2E-01	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix D, Table D-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant.

Table D-10
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Great horned owl*	*Mourning dove*
1,4-Dichlorobenzene	9.5E-04	2.2E-03	5.8E-04	2.4E-06	1.7E-05	4.6E-04
1,2,4-Trichlorobenzene	1.0E-03	2.4E-03	6.3E-04	2.6E-06	1.9E-05	5.0E-04
Aluminum	7.9E+01	4.6E+02	1.2E+02	4.1E-01	2.2E+00	4.8E+01
Antimony	5.4E-02	1.3E-01	3.4E-02	1.2E-04	6.3E-04	2.6E-02
Vanadium	2.1E-01	1.3E+00	3.6E-01	1.2E-03	6.7E-03	1.1E-01

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table D-11
Risk from Potential Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Cotton mouse*			*Short-tailed shrew*			*Eastern meadowlark*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	9.5E-04	7.6E+02	1.3E-06	2.2E-03	7.6E+02	2.9E-06	5.8E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	1.0E-03	1.5E+02	6.9E-06	2.4E-03	1.5E+02	1.6E-05	6.3E-04	NA	0.0E+00
Aluminum	7.9E+01	7.4E+02	1.1E-01	4.6E+02	7.4E+02	6.2E-01	1.2E+02	NA	0.0E+00
Antimony	5.4E-02	3.3E+03	1.6E-05	1.3E-01	3.3E+03	3.9E-05	3.4E-02	NA	0.0E+00
Vanadium	2.1E-01	6.2E+00	3.4E-02	1.3E+00	6.2E+00	2.1E-01	3.6E-01	1.9E+01	1.9E-02
SUMMARY HAZARD INDEX			1.4E-01			8.2E-01			1.9E-02

PDE = Potential Dietary Exposure (mg/kgBW/day)　RTV = Reference Toxicity Value (mg/kgBW/day)　HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-11
Risk from Potential Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	2.4E-06	7.6E+02	3.1E-09	1.7E-05	NA	0.0E+00	4.6E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	2.6E-06	1.5E+02	1.7E-08	1.9E-05	NA	0.0E+00	5.0E-04	NA	0.0E+00
Aluminum	4.1E-01	7.4E+02	5.5E-04	2.2E+00	NA	0.0E+00	4.8E+01	NA	0.0E+00
Antimony	1.2E-04	3.3E+03	3.7E-08	6.3E-04	NA	0.0E+00	2.6E-02	NA	0.0E+00
Vanadium	1.2E-03	6.2E+00	1.9E-04	6.7E-03	1.9E+01	3.5E-04	1.1E-01	1.9E+01	5.9E-03
SUMMARY HAZARD INDEX			7.4E-04			3.5E-04			5.9E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-12
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	9.5E-04	NA	0.0E+00	2.2E-03	NA	0.0E+00	5.8E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	1.0E-03	NA	0.0E+00	2.4E-03	NA	0.0E+00	6.3E-04	NA	0.0E+00
Aluminum	7.9E+01	4.3E+01	1.9E+00	4.6E+02	4.3E+01	1.1E+01	1.2E+02	NA	0.0E+00
Antimony	5.4E-02	NA	0.0E+00	1.3E-01	NA	0.0E+00	3.4E-02	NA	0.0E+00
Vanadium	2.1E-01	8.4E+00	2.5E-02	1.3E+00	8.4E+00	1.5E-01	3.6E-01	1.1E+00	3.3E-01
SUMMARY HAZARD INDEX			1.9E+00			1.1E+01			3.3E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
RTV = Reference Toxicity Value (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-12
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
1,4-Dichlorobenzene	2.4E-06	NA	0.0E+00	1.7E-05	NA	0.0E+00	4.6E-04	NA	0.0E+00
1,2,4-Trichlorobenzene	2.6E-06	NA	0.0E+00	1.9E-05	NA	0.0E+00	5.0E-04	NA	0.0E+00
Aluminum	4.1E-01	4.3E+01	9.6E-03	2.2E+00	NA	0.0E+00	4.8E+01	NA	0.0E+00
Antimony	1.2E-04	NA	0.0E+00	6.3E-04	NA	0.0E+00	2.6E-02	NA	0.0E+00
Vanadium	1.2E-03	8.4E+00	1.4E-04	6.7E-03	1.1E+00	6.1E-03	1.1E-01	1.1E+00	1.0E-01
SUMMARY HAZARD INDEX			9.8E-03			6.1E-03			1.0E-01

PDE = Potential Dietary Exposure (mg/kgBW/day)
RTV = Reference Toxicity Value (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-13
Exposure Parameters and Assumptions for Terrestrial Receptors [a]
Site 9 Surface Water
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

Representative Wildlife Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Small Birds	Soil	Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Water Ingestion Rate (kg/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	6.80E-01	0.0030	0.021
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.04E-01	0.0025	0.017
Eastern meadowlark	(Small insect. bird)	75%	20%	0%	0%	5%	5	1	2.00E-02	0.0115	0.087
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	250	1	4.00E-04	0.40	4.69
Great horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	6.67E-03	0.077	1.5
Mourning dove	(Small herb. bird)	1%	94%	0%	0%	5%	5	1	2.00E-02	0.015	0.13

NOTES:

SITE AREA:	0.1 acres

[a] Documentation of exposure parameters presented in: Table 7-7
[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area). ED is assumed to be 1 for this risk assessment.
[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0)).

Table D-14
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in SW
Site 9 Surface Water
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA

ANALYTE	REASONABLE MAXIMUM EXPOSURE CONCENTRATION (mg/kg)
Aluminum	1.3E-01
Iron	1.1E-01
Manganese	1.2E-02

Table D-14
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Surface Water
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Great horned owl*	*Mourning dove*
Aluminum	1.8E-02	1.9E-02	1.7E-02	1.1E-02	6.5E-03	1.5E-02
Iron	1.6E-02	1.6E-02	1.5E-02	9.5E-03	5.7E-03	1.3E-02
Manganese	1.7E-03	1.8E-03	1.6E-03	1.0E-03	6.2E-04	1.4E-03

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table D-15
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Surface Water
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Aluminum	1.8E-02	7.4E+02	2.4E-05	1.9E-02	7.4E+02	2.5E-05	1.7E-02	NA	0.0E+00
Iron	1.6E-02	2.4E+02	6.6E-05	1.6E-02	2.4E+02	6.8E-05	1.5E-02	NA	0.0E+00
Manganese	1.7E-03	4.5E+01	3.8E-05	1.8E-03	4.5E+01	4.0E-05	1.6E-03	NA	0.0E+00
SUMMARY HAZARD INDEX			1.3E-04			1.3E-04			0.0E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-15
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Surface Water
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Aluminum	1.1E-02	7.4E+02	1.4E-05	6.5E-03	NA	0.0E+00	1.5E-02	NA	0.0E+00
Iron	9.5E-03	2.4E+02	3.9E-05	5.7E-03	NA	0.0E+00	1.3E-02	NA	0.0E+00
Manganese	1.0E-03	4.5E+01	2.3E-05	6.2E-04	NA	0.0E+00	1.4E-03	NA	0.0E+00
SUMMARY HAZARD INDEX			7.7E-05			0.0E+00			0.0E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-16
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Surface Water
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Aluminum	1.8E-02	4.3E+01	4.2E-04	1.9E-02	4.3E+01	4.4E-04	1.7E-02	NA	0.0E+00
Iron	1.6E-02	NA	0.0E+00	1.6E-02	NA	0.0E+00	1.5E-02	NA	0.0E+00
Manganese	1.7E-03	1.4E+01	1.2E-04	1.8E-03	1.4E+01	1.3E-04	1.6E-03	NA	0.0E+00
SUMMARY HAZARD INDEX			5.5E-04			5.6E-04			0.0E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-16
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Surface Water
Site 9
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
Aluminum	1.1E-02	4.3E+01	2.5E-04	6.5E-03	NA	0.0E+00	1.5E-02	NA	0.0E+00
Iron	9.5E-03	NA	0.0E+00	5.7E-03	NA	0.0E+00	1.3E-02	NA	0.0E+00
Manganese	1.0E-03	1.4E+01	7.3E-05	6.2E-04	NA	0.0E+00	1.4E-03	NA	0.0E+00
SUMMARY HAZARD INDEX			3.2E-04			0.0E+00			0.0E+00

PDE = Potential Dietary Exposure (mg/kgBW/day)
RTV = Reference Toxicity Value (mg/kgBW/day)
HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-17
Exposure Parameters and Assumptions for Terrestrial Receptors [a]
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

Representative Wildlife Species		Percent Prey in Diet: Inverts	Plants	Small Mammals	Small Birds	Soil	Home Range (acres)	ED [b]	Site Foraging Frequency [c]	Food Ingestion Rate (kg/day)	Body Weight (kg)
Cotton mouse	(Small herb. mammal)	10%	88%	0%	0%	2%	0.147	1	1.00E+00	0.0029	0.021
Short-tailed shrew	(Small omn. mammal)	78%	12%	0%	0%	10%	0.96	1	1.00E+00	0.0024	0.017
Eastern meadowlark	(Small insect. bird)	75%	20%	0%	0%	5%	5	1	8.00E-01	0.0119	0.087
Red fox	(Predatory mammal)	20%	10%	57%	10%	3%	250	1	1.60E-02	0.24	4.69
Great horned owl	(Predatory bird)	0%	0%	80%	19%	1%	15	1	2.67E-01	0.078	1.5
Mourning dove	(Small herb. bird)	1%	94%	0%	0%	5%	5	1	8.00E-01	0.015	0.13

NOTES:

SITE AREA:	4.0 acres

[a] Documentation of exposure parameters presented in: Table 7-7
[b] ED = Exposure Duration (percentage of year receptor is expected to be found at study area). ED is assumed to be 1 for this risk assessment.
[c] SFF = Site Foraging Frequency (calculated by dividing site area by receptor home range (cannot exceed 1.0)).

Table D-18
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	REASONABLE MAXIMUM EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
2-Hexanone	4.8E-03	NA	0.0E+00	NA	0.0E+00	NA	NA
Acenaphthene	1.2E-01	5.0E-02	5.8E-03	5.9E-03	6.8E-04	3.8E-01	NA
Anthracene	2.3E-01	5.0E-02	1.1E-02	5.9E-03	1.3E-03	3.8E-01	NA
Benzo(a)anthracene	1.1E+00	5.0E-02	5.4E-02	5.9E-03	6.4E-03	3.8E-01	NA
Benzo(a)pyrene	1.3E+00	5.0E-02	6.6E-02	5.9E-03	7.7E-03	3.8E-01	NA
Benzo(b)fluoranthene	1.4E+00	5.0E-02	7.1E-02	5.9E-03	8.4E-03	3.8E-01	NA
Benzo(g,h,i)perylene	8.5E-01	5.0E-02	4.3E-02	5.9E-03	5.0E-03	3.8E-01	NA
Benzo(k)fluoranthene	1.1E+00	5.0E-02	5.3E-02	5.9E-03	6.2E-03	3.8E-01	NA
Butylbenzylphthalate	1.2E-01	5.0E-02	6.2E-03	2.2E-02	2.7E-03	1.5E-01	NA
Carbazole	1.6E-01	5.0E-02	8.0E-03	5.6E-02	9.0E-03	1.5E-01	NA
Chrysene	1.4E+00	5.0E-02	7.0E-02	5.9E-03	8.2E-03	3.8E-01	NA
Dibenzo(a,h)anthracene	3.5E-01	5.0E-02	1.7E-02	5.9E-03	2.0E-03	3.8E-01	NA
Dibenzofuran	5.2E-02	5.0E-02	2.6E-03	3.3E-02	1.7E-03	1.5E-01	NA
Diethylphthalate	9.6E-02	5.0E-02	4.8E-03	2.2E-02	2.1E-03	1.5E-01	NA
Fluoranthene	1.5E+00	5.0E-02	7.4E-02	5.9E-03	8.7E-03	3.8E-01	NA
Fluorene	1.2E-01	5.0E-02	6.0E-03	5.9E-03	7.1E-04	3.8E-01	NA
Indeno(1,2,3-cd)pyrene	8.5E-01	5.0E-02	4.3E-02	5.9E-03	5.0E-03	3.8E-01	NA
Phenanthrene	7.4E-01	5.0E-02	3.7E-02	5.9E-03	4.4E-03	3.8E-01	NA
Pyrene	1.8E+00	5.0E-02	9.0E-02	5.9E-03	1.1E-02	3.8E-01	NA
bis(2-ethylhexyl)phthalate	7.8E-01	5.0E-02	3.9E-02	2.2E-02	1.7E-02	1.5E-01	NA
Aroclor-1254	3.7E-01	5.8E+00	2.1E+00	1.2E-01	4.4E-02	3.8E+00	3.2E-01
Aroclor-1260	6.0E-02	5.8E+00	3.5E-01	1.2E-01	7.2E-03	3.8E+00	3.2E-01
Aluminum	2.4E+04	7.5E-02	1.8E+03	8.0E-04	1.9E+01	7.5E-02	NA
Cadmium	1.6E+00	1.1E+01	1.8E+01	3.3E+01	5.3E+01	2.1E+00	3.8E-01
Vanadium	4.5E+01	1.2E-01	5.4E+00	1.1E-03	5.0E-02	1.2E-01	NA
Zinc	5.7E+02	1.8E+00	1.0E+03	6.1E-01	3.5E+02	2.1E+00	NA
TPH	6.7E+02	NA	0.0E+00	NA	0.0E+00	NA	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix D, Table D-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant.

Table D-18
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Great horned owl*	*Mourning dove*
2-Hexanone	1.3E-05	6.7E-05	2.6E-05	1.2E-07	6.6E-07	2.2E-05
Acenaphthene	4.8E-04	2.3E-03	1.1E-03	5.6E-06	5.7E-05	5.9E-04
Anthracene	9.5E-04	4.5E-03	2.2E-03	1.1E-05	1.1E-04	1.2E-03
Benzo(a)anthracene	4.5E-03	2.1E-02	1.1E-02	5.2E-05	5.4E-04	5.6E-03
Benzo(a)pyrene	5.5E-03	2.6E-02	1.3E-02	6.3E-05	6.5E-04	6.8E-03
Benzo(b)fluoranthene	5.9E-03	2.8E-02	1.4E-02	6.9E-05	7.1E-04	7.4E-03
Benzo(g,h,i)perylene	3.6E-03	1.7E-02	8.3E-03	4.1E-05	4.2E-04	4.4E-03
Benzo(k)fluoranthene	4.4E-03	2.1E-02	1.0E-02	5.1E-05	5.2E-04	5.5E-03
Butylbenzylphthalate	7.6E-04	2.5E-03	1.2E-03	5.1E-06	3.6E-05	8.1E-04
Carbazole	1.6E-03	3.3E-03	1.7E-03	7.2E-06	5.1E-05	1.5E-03
Chrysene	5.8E-03	2.7E-02	1.4E-02	6.7E-05	6.9E-04	7.2E-03
Dibenzo(a,h)anthracene	1.4E-03	6.8E-03	3.4E-03	1.7E-05	1.7E-04	1.8E-03
Dibenzofuran	3.9E-04	1.0E-03	5.4E-04	2.2E-06	1.6E-05	3.9E-04
Diethylphthalate	5.9E-04	1.9E-03	9.7E-04	3.9E-06	2.8E-05	6.3E-04
Fluoranthene	6.2E-03	2.9E-02	1.4E-02	7.1E-05	7.4E-04	7.7E-03
Fluorene	5.0E-04	2.4E-03	1.2E-03	5.8E-06	6.0E-05	6.2E-04
Indeno(1,2,3-cd)pyrene	3.6E-03	1.7E-02	8.3E-03	4.1E-05	4.2E-04	4.4E-03
Phenanthrene	3.1E-03	1.5E-02	7.2E-03	3.6E-05	3.7E-04	3.8E-03
Pyrene	7.5E-03	3.6E-02	1.7E-02	8.7E-05	8.9E-04	9.3E-03
bis(2-ethylhexyl)phthalate	4.8E-03	1.6E-02	7.9E-03	3.2E-05	2.3E-04	5.1E-03
Aroclor-1254	3.6E-02	2.4E-01	1.8E-01	2.5E-03	4.2E-02	7.4E-03
Aroclor-1260	5.8E-03	3.9E-02	2.9E-02	7.8E-04	6.9E-03	1.2E-03
Aluminum	9.5E+01	5.5E+02	2.8E+02	9.8E-01	5.3E+00	1.2E+02
Cadmium	6.7E+00	2.9E+00	2.6E+00	4.1E-02	8.1E-01	4.6E+00
Vanadium	2.1E-01	1.2E+00	6.9E-01	2.3E-03	1.3E-02	2.2E-01
Zinc	5.8E+01	1.3E+02	9.4E+01	8.5E-01	1.5E+01	3.4E+01
TPH	1.8E+00	9.4E+00	3.6E+00	1.6E-02	9.2E-02	3.1E+00

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table D-19
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.3E-05	5.5E+02	2.4E-08	6.7E-05	5.5E+02	1.2E-07	2.6E-05	NA	0.0E+00
Acenaphthene	4.8E-04	1.2E+01	4.0E-05	2.3E-03	1.2E+01	1.9E-04	1.1E-03	NA	0.0E+00
Anthracene	9.5E-04	3.4E+03	2.8E-07	4.5E-03	3.4E+03	1.3E-06	2.2E-03	NA	0.0E+00
Benzo(a)anthracene	4.5E-03	1.2E+01	3.8E-04	2.1E-02	1.2E+01	1.8E-03	1.1E-02	NA	0.0E+00
Benzo(a)pyrene	5.5E-03	1.2E+01	4.6E-04	2.6E-02	1.2E+01	2.2E-03	1.3E-02	NA	0.0E+00
Benzo(b)fluoranthene	5.9E-03	1.2E+01	4.9E-04	2.8E-02	1.2E+01	2.3E-03	1.4E-02	NA	0.0E+00
Benzo(g,h,i)perylene	3.6E-03	1.2E+01	3.0E-04	1.7E-02	1.2E+01	1.4E-03	8.3E-03	NA	0.0E+00
Benzo(k)fluoranthene	4.4E-03	1.2E+01	3.7E-04	2.1E-02	1.2E+01	1.7E-03	1.0E-02	NA	0.0E+00
Butylbenzylphthalate	7.6E-04	4.7E+02	1.6E-06	2.5E-03	4.7E+02	5.3E-06	1.2E-03	NA	0.0E+00
Carbazole	1.6E-03	1.0E+02	1.6E-05	3.3E-03	1.0E+02	3.3E-05	1.7E-03	NA	0.0E+00
Chrysene	5.8E-03	1.2E+01	4.8E-04	2.7E-02	1.2E+01	2.3E-03	1.4E-02	NA	0.0E+00
Dibenzo(a,h)anthracene	1.4E-03	1.2E+01	1.2E-04	6.8E-03	1.2E+01	5.7E-04	3.4E-03	NA	0.0E+00
Dibenzofuran	3.9E-04	1.3E+01	3.1E-05	1.0E-03	1.3E+01	8.4E-05	5.4E-04	NA	0.0E+00
Diethylphthalate	5.9E-04	1.7E+03	3.4E-07	1.9E-03	1.7E+03	1.1E-06	9.7E-04	NA	0.0E+00
Fluoranthene	6.2E-03	4.0E+02	1.5E-05	2.9E-02	4.0E+02	7.3E-05	1.4E-02	NA	0.0E+00
Fluorene	5.0E-04	1.2E+01	4.2E-05	2.4E-03	1.2E+01	2.0E-04	1.2E-03	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	3.6E-03	1.2E+01	3.0E-04	1.7E-02	1.2E+01	1.4E-03	8.3E-03	NA	0.0E+00
Phenanthrene	3.1E-03	1.4E+02	2.2E-05	1.5E-02	1.4E+02	1.0E-04	7.2E-03	NA	0.0E+00
Pyrene	7.5E-03	1.6E+02	4.7E-05	3.6E-02	1.6E+02	2.2E-04	1.7E-02	NA	0.0E+00
bis(2-ethylhexyl)phthalate	4.8E-03	1.6E+02	3.0E-05	1.6E-02	1.6E+02	9.8E-05	7.9E-03	NA	0.0E+00
Aroclor-1254	3.6E-02	1.0E+02	3.6E-04	2.4E-01	1.0E+02	2.4E-03	1.8E-01	1.6E+01	1.1E-02
Aroclor-1260	5.8E-03	1.0E+02	5.8E-05	3.9E-02	1.0E+02	3.9E-04	2.9E-02	1.6E+01	1.8E-03
Aluminum	9.5E+01	7.4E+02	1.3E-01	5.5E+02	7.4E+02	7.4E-01	2.8E+02	NA	0.0E+00
Cadmium	6.7E+00	3.0E+01	2.2E-01	2.9E+00	3.0E+01	9.5E-02	2.6E+00	NA	0.0E+00
Vanadium	2.1E-01	6.2E+00	3.3E-02	1.2E+00	6.2E+00	2.0E-01	6.9E-01	1.9E+01	3.6E-02
Zinc	5.8E+01	5.0E+02	1.1E-01	1.3E+02	5.0E+02	2.5E-01	9.4E+01	NA	0.0E+00
TPH	1.8E+00	NA	0.0E+00	9.4E+00	NA	0.0E+00	3.6E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			5.0E-01			1.3E+00			4.9E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-19
Risk from Potential Lethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	*Red fox*			*Great horned owl*			*Mourning dove*		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.2E-07	5.5E+02	2.1E-10	6.6E-07	NA	0.0E+00	2.2E-05	NA	0.0E+00
Acenaphthene	5.6E-06	1.2E+01	4.6E-07	5.7E-05	NA	0.0E+00	5.9E-04	NA	0.0E+00
Anthracene	1.1E-05	3.4E+03	3.2E-09	1.1E-04	NA	0.0E+00	1.2E-03	NA	0.0E+00
Benzo(a)anthracene	5.2E-05	1.2E+01	4.4E-06	5.4E-04	NA	0.0E+00	5.6E-03	NA	0.0E+00
Benzo(a)pyrene	6.3E-05	1.2E+01	5.3E-06	6.5E-04	NA	0.0E+00	6.8E-03	NA	0.0E+00
Benzo(b)fluoranthene	6.9E-05	1.2E+01	5.7E-06	7.1E-04	NA	0.0E+00	7.4E-03	NA	0.0E+00
Benzo(g,h,i)perylene	4.1E-05	1.2E+01	3.4E-06	4.2E-04	NA	0.0E+00	4.4E-03	NA	0.0E+00
Benzo(k)fluoranthene	5.1E-05	1.2E+01	4.2E-06	5.2E-04	NA	0.0E+00	5.5E-03	NA	0.0E+00
Butylbenzylphthalate	5.1E-06	4.7E+02	1.1E-08	3.6E-05	NA	0.0E+00	8.1E-04	NA	0.0E+00
Carbazole	7.2E-06	1.0E+02	7.2E-08	5.1E-05	NA	0.0E+00	1.5E-03	NA	0.0E+00
Chrysene	6.7E-05	1.2E+01	5.6E-06	6.9E-04	NA	0.0E+00	7.2E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.7E-05	1.2E+01	1.4E-06	1.7E-04	NA	0.0E+00	1.8E-03	NA	0.0E+00
Dibenzofuran	2.2E-06	1.3E+01	1.8E-07	1.6E-05	NA	0.0E+00	3.9E-04	NA	0.0E+00
Diethylphthalate	3.9E-06	1.7E+03	2.3E-09	2.8E-05	NA	0.0E+00	6.3E-04	NA	0.0E+00
Fluoranthene	7.1E-05	4.0E+02	1.8E-07	7.4E-04	NA	0.0E+00	7.7E-03	NA	0.0E+00
Fluorene	5.8E-06	1.2E+01	4.8E-07	6.0E-05	NA	0.0E+00	6.2E-04	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	4.1E-05	1.2E+01	3.4E-06	4.2E-04	NA	0.0E+00	4.4E-03	NA	0.0E+00
Phenanthrene	3.6E-05	1.4E+02	2.6E-07	3.7E-04	NA	0.0E+00	3.8E-03	NA	0.0E+00
Pyrene	8.7E-05	1.6E+02	5.4E-07	8.9E-04	NA	0.0E+00	9.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	3.2E-05	1.6E+02	2.0E-07	2.3E-04	NA	0.0E+00	5.1E-03	NA	0.0E+00
Aroclor-1254	2.5E-03	1.5E+02	1.7E-05	4.2E-02	1.6E+01	2.6E-03	7.4E-03	1.6E+01	4.6E-04
Aroclor-1260	7.8E-04	1.5E+02	5.2E-06	6.9E-03	1.6E+01	4.3E-04	1.2E-03	1.6E+01	7.6E-05
Aluminum	9.8E-01	7.4E+02	1.3E-03	5.3E+00	NA	0.0E+00	1.2E+02	NA	0.0E+00
Cadmium	4.1E-02	3.0E+01	1.4E-03	8.1E-01	NA	0.0E+00	4.6E+00	NA	0.0E+00
Vanadium	2.3E-03	6.2E+00	3.7E-04	1.3E-02	1.9E+01	6.8E-04	2.2E-01	1.9E+01	1.1E-02
Zinc	8.5E-01	5.0E+02	1.7E-03	1.5E+01	NA	0.0E+00	3.4E+01	NA	0.0E+00
TPH	1.6E-02	NA	0.0E+00	9.2E-02	NA	0.0E+00	3.1E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			4.8E-03			3.7E-03			1.2E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-20
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.3E-05	1.7E+02	7.6E-08	6.7E-05	1.7E+02	3.9E-07	2.6E-05	NA	0.0E+00
Acenaphthene	4.8E-04	1.0E+01	4.8E-05	2.3E-03	1.0E+01	2.3E-04	1.1E-03	NA	0.0E+00
Anthracene	9.5E-04	1.0E+01	9.5E-05	4.5E-03	1.0E+01	4.5E-04	2.2E-03	NA	0.0E+00
Benzo(a)anthracene	4.5E-03	1.0E+01	4.5E-04	2.1E-02	1.0E+01	2.1E-03	1.1E-02	NA	0.0E+00
Benzo(a)pyrene	5.5E-03	1.0E+01	5.5E-04	2.6E-02	1.0E+01	2.6E-03	1.3E-02	NA	0.0E+00
Benzo(b)fluoranthene	5.9E-03	1.0E+01	5.9E-04	2.8E-02	1.0E+01	2.8E-03	1.4E-02	NA	0.0E+00
Benzo(g,h,i)perylene	3.6E-03	1.0E+01	3.6E-04	1.7E-02	1.0E+01	1.7E-03	8.3E-03	NA	0.0E+00
Benzo(k)fluoranthene	4.4E-03	1.0E+01	4.4E-04	2.1E-02	1.0E+01	2.1E-03	1.0E-02	NA	0.0E+00
Butylbenzylphthalate	7.6E-04	4.9E+02	1.5E-06	2.5E-03	4.9E+02	5.0E-06	1.2E-03	NA	0.0E+00
Carbazole	1.6E-03	NA	0.0E+00	3.3E-03	NA	0.0E+00	1.7E-03	NA	0.0E+00
Chrysene	5.8E-03	1.0E+01	5.8E-04	2.7E-02	1.0E+01	2.7E-03	1.4E-02	NA	0.0E+00
Dibenzo(a,h)anthracene	1.4E-03	1.0E+01	1.4E-04	6.8E-03	1.0E+01	6.8E-04	3.4E-03	NA	0.0E+00
Dibenzofuran	3.9E-04	6.0E+01	6.5E-06	1.0E-03	6.0E+01	1.7E-05	5.4E-04	NA	0.0E+00
Diethylphthalate	5.9E-04	3.3E+02	1.8E-06	1.9E-03	3.3E+02	5.9E-06	9.7E-04	NA	0.0E+00
Fluoranthene	6.2E-03	1.0E+01	6.2E-04	2.9E-02	1.0E+01	2.9E-03	1.4E-02	NA	0.0E+00
Fluorene	5.0E-04	1.0E+01	5.0E-05	2.4E-03	1.0E+01	2.4E-04	1.2E-03	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	3.6E-03	1.0E+01	3.6E-04	1.7E-02	1.0E+01	1.7E-03	8.3E-03	NA	0.0E+00
Phenanthrene	3.1E-03	1.0E+01	3.1E-04	1.5E-02	1.0E+01	1.5E-03	7.2E-03	NA	0.0E+00
Pyrene	7.5E-03	1.0E+01	7.5E-04	3.6E-02	1.0E+01	3.6E-03	1.7E-02	NA	0.0E+00
bis(2-ethylhexyl)phthalate	4.8E-03	3.5E+00	1.4E-03	1.6E-02	3.5E+00	4.5E-03	7.9E-03	NA	0.0E+00
Aroclor-1254	3.6E-02	1.5E-01	2.3E-01	2.4E-01	1.5E-01	1.6E+00	1.8E-01	9.0E-02	2.0E+00
Aroclor-1260	5.8E-03	6.4E-01	9.1E-03	3.9E-02	6.4E-01	6.1E-02	2.9E-02	9.0E-01	3.2E-02
Aluminum	9.5E+01	4.3E+01	2.2E+00	5.5E+02	4.3E+01	1.3E+01	2.8E+02	NA	0.0E+00
Cadmium	6.7E+00	2.2E+00	3.1E+00	2.9E+00	2.2E+00	1.3E+00	2.6E+00	1.0E+00	2.6E+00
Vanadium	2.1E-01	8.4E+00	2.4E-02	1.2E+00	8.4E+00	1.5E-01	6.9E-01	1.1E+00	6.3E-01
Zinc	5.8E+01	2.0E+01	2.9E+00	1.3E+02	2.0E+01	6.3E+00	9.4E+01	NA	0.0E+00
TPH	1.8E+00	NA	0.0E+00	9.4E+00	NA	0.0E+00	3.6E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			8.5E+00			2.2E+01			5.2E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-20
Risk from Potential Sublethal Effects for Terrestrial Receptors from Reasonable Maximum Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.2E-07	1.7E+02	6.7E-10	6.6E-07	NA	0.0E+00	2.2E-05	NA	0.0E+00
Acenaphthene	5.6E-06	1.0E+01	5.6E-07	5.7E-05	NA	0.0E+00	5.9E-04	NA	0.0E+00
Anthracene	1.1E-05	1.0E+01	1.1E-06	1.1E-04	NA	0.0E+00	1.2E-03	NA	0.0E+00
Benzo(a)anthracene	5.2E-05	1.0E+01	5.2E-06	5.4E-04	NA	0.0E+00	5.6E-03	NA	0.0E+00
Benzo(a)pyrene	6.3E-05	1.0E+01	6.3E-06	6.5E-04	NA	0.0E+00	6.8E-03	NA	0.0E+00
Benzo(b)fluoranthene	6.9E-05	1.0E+01	6.9E-06	7.1E-04	NA	0.0E+00	7.4E-03	NA	0.0E+00
Benzo(g,h,i)perylene	4.1E-05	1.0E+01	4.1E-06	4.2E-04	NA	0.0E+00	4.4E-03	NA	0.0E+00
Benzo(k)fluoranthene	5.1E-05	1.0E+01	5.1E-06	5.2E-04	NA	0.0E+00	5.5E-03	NA	0.0E+00
Butylbenzylphthalate	5.1E-06	4.9E+02	1.0E-08	3.6E-05	NA	0.0E+00	8.1E-04	NA	0.0E+00
Carbazole	7.2E-06	NA	0.0E+00	5.1E-05	NA	0.0E+00	1.5E-03	NA	0.0E+00
Chrysene	6.7E-05	1.0E+01	6.7E-06	6.9E-04	NA	0.0E+00	7.2E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.7E-05	1.0E+01	1.7E-06	1.7E-04	NA	0.0E+00	1.8E-03	NA	0.0E+00
Dibenzofuran	2.2E-06	6.0E+01	3.7E-08	1.6E-05	NA	0.0E+00	3.9E-04	NA	0.0E+00
Diethylphthalate	3.9E-06	3.3E+02	1.2E-08	2.8E-05	NA	0.0E+00	6.3E-04	NA	0.0E+00
Fluoranthene	7.1E-05	1.0E+01	7.1E-06	7.4E-04	NA	0.0E+00	7.7E-03	NA	0.0E+00
Fluorene	5.8E-06	1.0E+01	5.8E-07	6.0E-05	NA	0.0E+00	6.2E-04	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	4.1E-05	1.0E+01	4.1E-06	4.2E-04	NA	0.0E+00	4.4E-03	NA	0.0E+00
Phenanthrene	3.6E-05	1.0E+01	3.6E-06	3.7E-04	NA	0.0E+00	3.8E-03	NA	0.0E+00
Pyrene	8.7E-05	1.0E+01	8.7E-06	8.9E-04	NA	0.0E+00	9.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	3.2E-05	3.5E+00	9.2E-06	2.3E-04	NA	0.0E+00	5.1E-03	NA	0.0E+00
Aroclor-1254	2.5E-03	9.6E-03	2.6E-01	4.2E-02	9.0E-01	4.6E-02	7.4E-03	9.0E-02	8.3E-02
Aroclor-1260	7.8E-04	7.5E-04	1.0E+00	6.9E-03	9.0E-01	7.6E-03	1.2E-03	9.0E-01	1.4E-03
Aluminum	9.8E-01	4.3E+01	2.3E-02	5.3E+00	NA	0.0E+00	1.2E+02	NA	0.0E+00
Cadmium	4.1E-02	2.2E+00	1.9E-02	8.1E-01	1.0E+00	8.1E-01	4.6E+00	1.0E+00	4.6E+00
Vanadium	2.3E-03	8.4E+00	2.7E-04	1.3E-02	1.1E+00	1.2E-02	2.2E-01	1.1E+00	2.0E-01
Zinc	8.5E-01	2.0E+01	4.3E-02	1.5E+01	NA	0.0E+00	3.4E+01	NA	0.0E+00
TPH	1.6E-02	NA	0.0E+00	9.2E-02	NA	0.0E+00	3.1E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			1.4E+00			8.7E-01			4.9E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-21
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

EXPOSURE CONCENTRATION DATA		ESTIMATED CONTAMINANT CONCENTRATIONS IN PRIMARY FOOD ITEMS				BAF VALUES FOR OTHER FOOD ITEMS	
ANALYTE	CENTRAL TENDENCY EXPOSURE CONCENTRATION (mg/kg)	Invert BAF [a]	Concentration in Invertebrate Tissue [b] (mg/kg)	Plant BAF [a]	Concentration in Plant Tissue [c] (mg/kg)	Small Mammal BAF [a]	Small Bird BAF [a]
2-Hexanone	4.8E-03	NA	0.0E+00	NA	0.0E+00	NA	NA
Acenaphthene	1.2E-01	5.0E-02	5.8E-03	5.9E-03	6.8E-04	3.8E-01	NA
Anthracene	2.3E-01	5.0E-02	1.1E-02	5.9E-03	1.3E-03	3.8E-01	NA
Benzo(a)anthracene	3.3E-01	5.0E-02	1.6E-02	5.9E-03	1.9E-03	3.8E-01	NA
Benzo(a)pyrene	4.3E-01	5.0E-02	2.1E-02	5.9E-03	2.5E-03	3.8E-01	NA
Benzo(b)fluoranthene	4.5E-01	5.0E-02	2.3E-02	5.9E-03	2.7E-03	3.8E-01	NA
Benzo(g,h,i)perylene	5.2E-01	5.0E-02	2.6E-02	5.9E-03	3.1E-03	3.8E-01	NA
Benzo(k)fluoranthene	4.1E-01	5.0E-02	2.0E-02	5.9E-03	2.4E-03	3.8E-01	NA
Butylbenzylphthalate	1.2E-01	5.0E-02	6.2E-03	2.2E-02	2.7E-03	1.5E-01	NA
Carbazole	1.6E-01	5.0E-02	8.0E-03	5.6E-02	9.0E-03	1.5E-01	NA
Chrysene	3.6E-01	5.0E-02	1.8E-02	5.9E-03	2.1E-03	3.8E-01	NA
Dibenzo(a,h)anthracene	2.6E-01	5.0E-02	1.3E-02	5.9E-03	1.5E-03	3.8E-01	NA
Dibenzofuran	5.2E-02	5.0E-02	2.6E-03	3.3E-02	1.7E-03	1.5E-01	NA
Diethylphthalate	9.6E-02	5.0E-02	4.8E-03	2.2E-02	2.1E-03	1.5E-01	NA
Fluoranthene	4.5E-01	5.0E-02	2.3E-02	5.9E-03	2.7E-03	3.8E-01	NA
Fluorene	1.2E-01	5.0E-02	6.0E-03	5.9E-03	7.1E-04	3.8E-01	NA
Indeno(1,2,3-cd)pyrene	4.5E-01	5.0E-02	2.3E-02	5.9E-03	2.7E-03	3.8E-01	NA
Phenanthrene	3.1E-01	5.0E-02	1.5E-02	5.9E-03	1.8E-03	3.8E-01	NA
Pyrene	4.5E-01	5.0E-02	2.2E-02	5.9E-03	2.6E-03	3.8E-01	NA
bis(2-ethylhexyl)phthalate	3.5E-01	5.0E-02	1.7E-02	2.2E-02	7.6E-03	1.5E-01	NA
Aroclor-1254	1.4E-01	5.8E+00	8.2E-01	1.2E-01	1.7E-02	3.8E+00	3.2E-01
Aroclor-1260	6.0E-02	5.8E+00	3.5E-01	1.2E-01	7.2E-03	3.8E+00	3.2E-01
Aluminum	1.7E+04	7.5E-02	1.3E+03	8.0E-04	1.3E+01	7.5E-02	NA
Cadmium	9.9E-01	1.1E+01	1.1E+01	3.3E+01	3.3E+01	2.1E+00	3.8E-01
Vanadium	3.4E+01	1.2E-01	4.1E+00	1.1E-03	3.7E-02	1.2E-01	NA
Zinc	9.5E+01	1.8E+00	1.7E+02	6.1E-01	5.8E+01	2.1E+00	NA
TPH	2.5E+02	NA	0.0E+00	NA	0.0E+00	NA	NA

ECPC = Ecological Chemical of Potential Concern
[a] Bioaccumulation data presented in: Appendix D, Table D-1
[b] ECPC concentrations in invertebrate tissue equals the invertebrate BAF multiplied by the maximum soil concentration of the contaminant.
[c] ECPC concentrations in plant tissue equals the plant BAF multiplied by the maximum soil concentration of the contaminant.

Table D-21
Estimated Chronic Exposure to Terrestrial Receptors from Ingestion of Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

POTENTIAL DIETARY EXPOSURE (mg/kgBW/day) [d]

ANALYTE	*Cotton mouse*	*Short-tailed shrew*	*Eastern meadowlark*	*Red fox*	*Great horned owl*	*Mourning dove*
2-Hexanone	1.3E-05	6.7E-05	2.6E-05	1.2E-07	6.6E-07	2.2E-05
Acenaphthene	4.8E-04	2.3E-03	1.1E-03	5.6E-06	5.7E-05	5.9E-04
Anthracene	9.5E-04	4.5E-03	2.2E-03	1.1E-05	1.1E-04	1.2E-03
Benzo(a)anthracene	1.4E-03	6.4E-03	3.2E-03	1.6E-05	1.6E-04	1.7E-03
Benzo(a)pyrene	1.8E-03	8.4E-03	4.1E-03	2.1E-05	2.1E-04	2.2E-03
Benzo(b)fluoranthene	1.9E-03	8.9E-03	4.4E-03	2.2E-05	2.2E-04	2.3E-03
Benzo(g,h,i)perylene	2.2E-03	1.0E-02	5.0E-03	2.5E-05	2.6E-04	2.7E-03
Benzo(k)fluoranthene	1.7E-03	8.0E-03	3.9E-03	2.0E-05	2.0E-04	2.1E-03
Butylbenzylphthalate	7.6E-04	2.5E-03	1.2E-03	5.1E-06	3.6E-05	8.1E-04
Carbazole	1.6E-03	3.3E-03	1.7E-03	7.2E-06	5.1E-05	1.5E-03
Chrysene	1.5E-03	7.0E-03	3.5E-03	1.7E-05	1.8E-04	1.8E-03
Dibenzo(a,h)anthracene	1.1E-03	5.1E-03	2.5E-03	1.2E-05	1.3E-04	1.3E-03
Dibenzofuran	3.9E-04	1.0E-03	5.4E-04	2.2E-06	1.6E-05	3.9E-04
Diethylphthalate	5.9E-04	1.9E-03	9.7E-04	3.9E-06	2.8E-05	6.3E-04
Fluoranthene	1.9E-03	8.9E-03	4.4E-03	2.2E-05	2.2E-04	2.3E-03
Fluorene	5.0E-04	2.4E-03	1.2E-03	5.8E-06	6.0E-05	6.2E-04
Indeno(1,2,3-cd)pyrene	1.9E-03	8.9E-03	4.4E-03	2.2E-05	2.2E-04	2.3E-03
Phenanthrene	1.3E-03	6.0E-03	3.0E-03	1.5E-05	1.5E-04	1.6E-03
Pyrene	1.9E-03	8.8E-03	4.3E-03	2.1E-05	2.2E-04	2.3E-03
bis(2-ethylhexyl)phthalate	2.1E-03	6.9E-03	3.5E-03	1.4E-05	1.0E-04	2.3E-03
Aroclor-1254	1.4E-02	9.2E-02	6.8E-02	1.2E-03	1.6E-02	2.9E-03
Aroclor-1260	5.8E-03	3.9E-02	2.9E-02	7.8E-04	6.9E-03	1.2E-03
Aluminum	6.5E+01	3.7E+02	1.9E+02	6.7E-01	3.6E+00	7.9E+01
Cadmium	4.1E+00	1.8E+00	1.6E+00	2.6E-02	5.2E-01	2.8E+00
Vanadium	1.5E-01	9.2E-01	5.2E-01	1.7E-03	9.8E-03	1.6E-01
Zinc	9.7E+00	2.1E+01	1.6E+01	1.4E-01	2.6E+00	5.6E+00
TPH	7.0E-01	3.6E+00	1.4E+00	6.2E-03	3.5E-02	1.2E+00

[d] Calculated by summing the products of individual prey type concentrations and percent in diet, multiplying by the ingestion rate, and dividing by body weight.

Table D-22
Risk from Potential Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.3E-05	5.5E+02	2.4E-08	6.7E-05	5.5E+02	1.2E-07	2.6E-05	NA	0.0E+00
Acenaphthene	4.8E-04	1.2E+01	4.0E-05	2.3E-03	1.2E+01	1.9E-04	1.1E-03	NA	0.0E+00
Anthracene	9.5E-04	3.4E+03	2.8E-07	4.5E-03	3.4E+03	1.3E-06	2.2E-03	NA	0.0E+00
Benzo(a)anthracene	1.4E-03	1.2E+01	1.1E-04	6.4E-03	1.2E+01	5.4E-04	3.2E-03	NA	0.0E+00
Benzo(a)pyrene	1.8E-03	1.2E+01	1.5E-04	8.4E-03	1.2E+01	7.0E-04	4.1E-03	NA	0.0E+00
Benzo(b)fluoranthene	1.9E-03	1.2E+01	1.6E-04	8.9E-03	1.2E+01	7.4E-04	4.4E-03	NA	0.0E+00
Benzo(g,h,i)perylene	2.2E-03	1.2E+01	1.8E-04	1.0E-02	1.2E+01	8.5E-04	5.0E-03	NA	0.0E+00
Benzo(k)fluoranthene	1.7E-03	1.2E+01	1.4E-04	8.0E-03	1.2E+01	6.7E-04	3.9E-03	NA	0.0E+00
Butylbenzylphthalate	7.6E-04	4.7E+02	1.6E-06	2.5E-03	4.7E+02	5.3E-06	1.2E-03	NA	0.0E+00
Carbazole	1.6E-03	1.0E+02	1.6E-05	3.3E-03	1.0E+02	3.3E-05	1.7E-03	NA	0.0E+00
Chrysene	1.5E-03	1.2E+01	1.2E-04	7.0E-03	1.2E+01	5.9E-04	3.5E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.1E-03	1.2E+01	9.0E-05	5.1E-03	1.2E+01	4.2E-04	2.5E-03	NA	0.0E+00
Dibenzofuran	3.9E-04	1.3E+01	3.1E-05	1.0E-03	1.3E+01	8.4E-05	5.4E-04	NA	0.0E+00
Diethylphthalate	5.9E-04	1.7E+03	3.4E-07	1.9E-03	1.7E+03	1.1E-06	9.7E-04	NA	0.0E+00
Fluoranthene	1.9E-03	4.0E+02	4.7E-06	8.9E-03	4.0E+02	2.2E-05	4.4E-03	NA	0.0E+00
Fluorene	5.0E-04	1.2E+01	4.2E-05	2.4E-03	1.2E+01	2.0E-04	1.2E-03	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	1.9E-03	1.2E+01	1.6E-04	8.9E-03	1.2E+01	7.4E-04	4.4E-03	NA	0.0E+00
Phenanthrene	1.3E-03	1.4E+02	9.1E-06	6.0E-03	1.4E+02	4.3E-05	3.0E-03	NA	0.0E+00
Pyrene	1.9E-03	1.6E+02	1.2E-05	8.8E-03	1.6E+02	5.5E-05	4.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	2.1E-03	1.6E+02	1.3E-05	6.9E-03	1.6E+02	4.3E-05	3.5E-03	NA	0.0E+00
Aroclor-1254	1.4E-02	1.0E+02	1.4E-04	9.2E-02	1.0E+02	9.2E-04	6.8E-02	1.6E+01	4.3E-03
Aroclor-1260	5.8E-03	1.0E+02	5.8E-05	3.9E-02	1.0E+02	3.9E-04	2.9E-02	1.6E+01	1.8E-03
Aluminum	6.5E+01	7.4E+02	8.8E-02	3.7E+02	7.4E+02	5.0E-01	1.9E+02	NA	0.0E+00
Cadmium	4.1E+00	3.0E+01	1.4E-01	1.8E+00	3.0E+01	5.9E-02	1.6E+00	NA	0.0E+00
Vanadium	1.5E-01	6.2E+00	2.5E-02	9.2E-01	6.2E+00	1.5E-01	5.2E-01	1.9E+01	2.7E-02
Zinc	9.7E+00	5.0E+02	1.9E-02	2.1E+01	5.0E+02	4.2E-02	1.6E+01	NA	0.0E+00
TPH	7.0E-01	NA	0.0E+00	3.6E+00	NA	0.0E+00	1.4E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			2.7E-01			7.6E-01			3.3E-02

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-22
Risk from Potential Lethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.2E-07	5.5E+02	2.1E-10	6.6E-07	NA	0.0E+00	2.2E-05	NA	0.0E+00
Acenaphthene	5.6E-06	1.2E+01	4.6E-07	5.7E-05	NA	0.0E+00	5.9E-04	NA	0.0E+00
Anthracene	1.1E-05	3.4E+03	3.2E-09	1.1E-04	NA	0.0E+00	1.2E-03	NA	0.0E+00
Benzo(a)anthracene	1.6E-05	1.2E+01	1.3E-06	1.6E-04	NA	0.0E+00	1.7E-03	NA	0.0E+00
Benzo(a)pyrene	2.1E-05	1.2E+01	1.7E-06	2.1E-04	NA	0.0E+00	2.2E-03	NA	0.0E+00
Benzo(b)fluoranthene	2.2E-05	1.2E+01	1.8E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Benzo(g,h,i)perylene	2.5E-05	1.2E+01	2.1E-06	2.6E-04	NA	0.0E+00	2.7E-03	NA	0.0E+00
Benzo(k)fluoranthene	2.0E-05	1.2E+01	1.6E-06	2.0E-04	NA	0.0E+00	2.1E-03	NA	0.0E+00
Butylbenzylphthalate	5.1E-06	4.7E+02	1.1E-08	3.6E-05	NA	0.0E+00	8.1E-04	NA	0.0E+00
Carbazole	7.2E-06	1.0E+02	7.2E-08	5.1E-05	NA	0.0E+00	1.5E-03	NA	0.0E+00
Chrysene	1.7E-05	1.2E+01	1.4E-06	1.8E-04	NA	0.0E+00	1.8E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.2E-05	1.2E+01	1.0E-06	1.3E-04	NA	0.0E+00	1.3E-03	NA	0.0E+00
Dibenzofuran	2.2E-06	1.3E+01	1.8E-07	1.6E-05	NA	0.0E+00	3.9E-04	NA	0.0E+00
Diethylphthalate	3.9E-06	1.7E+03	2.3E-09	2.8E-05	NA	0.0E+00	6.3E-04	NA	0.0E+00
Fluoranthene	2.2E-05	4.0E+02	5.4E-08	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Fluorene	5.8E-06	1.2E+01	4.8E-07	6.0E-05	NA	0.0E+00	6.2E-04	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	2.2E-05	1.2E+01	1.8E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Phenanthrene	1.5E-05	1.4E+02	1.1E-07	1.5E-04	NA	0.0E+00	1.6E-03	NA	0.0E+00
Pyrene	2.1E-05	1.6E+02	1.3E-07	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	1.4E-05	1.6E+02	8.9E-08	1.0E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Aroclor-1254	1.2E-03	1.5E+02	8.3E-06	1.6E-02	1.6E+01	1.0E-03	2.9E-03	1.6E+01	1.8E-04
Aroclor-1260	7.8E-04	1.5E+02	5.2E-06	6.9E-03	1.6E+01	4.3E-04	1.2E-03	1.6E+01	7.6E-05
Aluminum	6.7E-01	7.4E+02	9.1E-04	3.6E+00	NA	0.0E+00	7.9E+01	NA	0.0E+00
Cadmium	2.6E-02	3.0E+01	8.6E-04	5.2E-01	NA	0.0E+00	2.8E+00	NA	0.0E+00
Vanadium	1.7E-03	6.2E+00	2.8E-04	9.8E-03	1.9E+01	5.1E-04	1.6E-01	1.9E+01	8.5E-03
Zinc	1.4E-01	5.0E+02	2.8E-04	2.6E+00	NA	0.0E+00	5.6E+00	NA	0.0E+00
TPH	6.2E-03	NA	0.0E+00	3.5E-02	NA	0.0E+00	1.2E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			2.4E-03			1.9E-03			8.7E-03

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-23
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Cotton mouse			Short-tailed shrew			Eastern meadowlark		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.3E-05	1.7E+02	7.6E-08	6.7E-05	1.7E+02	3.9E-07	2.6E-05	NA	0.0E+00
Acenaphthene	4.8E-04	1.0E+01	4.8E-05	2.3E-03	1.0E+01	2.3E-04	1.1E-03	NA	0.0E+00
Anthracene	9.5E-04	1.0E+01	9.5E-05	4.5E-03	1.0E+01	4.5E-04	2.2E-03	NA	0.0E+00
Benzo(a)anthracene	1.4E-03	1.0E+01	1.4E-04	6.4E-03	1.0E+01	6.4E-04	3.2E-03	NA	0.0E+00
Benzo(a)pyrene	1.8E-03	1.0E+01	1.8E-04	8.4E-03	1.0E+01	8.4E-04	4.1E-03	NA	0.0E+00
Benzo(b)fluoranthene	1.9E-03	1.0E+01	1.9E-04	8.9E-03	1.0E+01	8.9E-04	4.4E-03	NA	0.0E+00
Benzo(g,h,i)perylene	2.2E-03	1.0E+01	2.2E-04	1.0E-02	1.0E+01	1.0E-03	5.0E-03	NA	0.0E+00
Benzo(k)fluoranthene	1.7E-03	1.0E+01	1.7E-04	8.0E-03	1.0E+01	8.0E-04	3.9E-03	NA	0.0E+00
Butylbenzylphthalate	7.6E-04	4.9E+02	1.5E-06	2.5E-03	4.9E+02	5.0E-06	1.2E-03	NA	0.0E+00
Carbazole	1.6E-03	NA	0.0E+00	3.3E-03	NA	0.0E+00	1.7E-03	NA	0.0E+00
Chrysene	1.5E-03	1.0E+01	1.5E-04	7.0E-03	1.0E+01	7.0E-04	3.5E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.1E-03	1.0E+01	1.1E-04	5.1E-03	1.0E+01	5.1E-04	2.5E-03	NA	0.0E+00
Dibenzofuran	3.9E-04	6.0E+01	6.5E-06	1.0E-03	6.0E+01	1.7E-05	5.4E-04	NA	0.0E+00
Diethylphthalate	5.9E-04	3.3E+02	1.8E-06	1.9E-03	3.3E+02	5.9E-06	9.7E-04	NA	0.0E+00
Fluoranthene	1.9E-03	1.0E+01	1.9E-04	8.9E-03	1.0E+01	8.9E-04	4.4E-03	NA	0.0E+00
Fluorene	5.0E-04	1.0E+01	5.0E-05	2.4E-03	1.0E+01	2.4E-04	1.2E-03	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	1.9E-03	1.0E+01	1.9E-04	8.9E-03	1.0E+01	8.9E-04	4.4E-03	NA	0.0E+00
Phenanthrene	1.3E-03	1.0E+01	1.3E-04	6.0E-03	1.0E+01	6.0E-04	3.0E-03	NA	0.0E+00
Pyrene	1.9E-03	1.0E+01	1.9E-04	8.8E-03	1.0E+01	8.8E-04	4.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	2.1E-03	3.5E+00	6.1E-04	6.9E-03	3.5E+00	2.0E-03	3.5E-03	NA	0.0E+00
Aroclor-1254	1.4E-02	1.5E-01	9.0E-02	9.2E-02	1.5E-01	6.0E-01	6.8E-02	9.0E-02	7.6E-01
Aroclor-1260	5.8E-03	6.4E-01	9.1E-03	3.9E-02	6.4E-01	6.1E-02	2.9E-02	9.0E-01	3.2E-02
Aluminum	6.5E+01	4.3E+01	1.5E+00	3.7E+02	4.3E+01	8.8E+00	1.9E+02	NA	0.0E+00
Cadmium	4.1E+00	2.2E+00	1.9E+00	1.8E+00	2.2E+00	8.2E-01	1.6E+00	1.0E+00	1.6E+00
Vanadium	1.5E-01	8.4E+00	1.8E-02	9.2E-01	8.4E+00	1.1E-01	5.2E-01	1.1E+00	4.7E-01
Zinc	9.7E+00	2.0E+01	4.8E-01	2.1E+01	2.0E+01	1.1E+00	1.6E+01	NA	0.0E+00
TPH	7.0E-01	NA	0.0E+00	3.6E+00	NA	0.0E+00	1.4E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			4.0E+00			1.1E+01			2.9E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

Table D-23
Risk from Potential Sublethal Effects for Terrestrial Receptors from Central Tendency Exposure Concentrations of ECPCs in Food and Surface Soil
Site 10
Remedial Investigation Report, Sites 9 and 10
Naval Air Station Whiting Field, Milton, Florida

ANALYTE	Red fox			Great horned owl			Mourning dove		
	PDE	RTV	HQ	PDE	RTV	HQ	PDE	RTV	HQ
2-Hexanone	1.2E-07	1.7E+02	6.7E-10	6.6E-07	NA	0.0E+00	2.2E-05	NA	0.0E+00
Acenaphthene	5.6E-06	1.0E+01	5.6E-07	5.7E-05	NA	0.0E+00	5.9E-04	NA	0.0E+00
Anthracene	1.1E-05	1.0E+01	1.1E-06	1.1E-04	NA	0.0E+00	1.2E-03	NA	0.0E+00
Benzo(a)anthracene	1.6E-05	1.0E+01	1.6E-06	1.6E-04	NA	0.0E+00	1.7E-03	NA	0.0E+00
Benzo(a)pyrene	2.1E-05	1.0E+01	2.1E-06	2.1E-04	NA	0.0E+00	2.2E-03	NA	0.0E+00
Benzo(b)fluoranthene	2.2E-05	1.0E+01	2.2E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Benzo(g,h,i)perylene	2.5E-05	1.0E+01	2.5E-06	2.6E-04	NA	0.0E+00	2.7E-03	NA	0.0E+00
Benzo(k)fluoranthene	2.0E-05	1.0E+01	2.0E-06	2.0E-04	NA	0.0E+00	2.1E-03	NA	0.0E+00
Butylbenzylphthalate	5.1E-06	4.9E+02	1.0E-08	3.6E-05	NA	0.0E+00	8.1E-04	NA	0.0E+00
Carbazole	7.2E-06	NA	0.0E+00	5.1E-05	NA	0.0E+00	1.5E-03	NA	0.0E+00
Chrysene	1.7E-05	1.0E+01	1.7E-06	1.8E-04	NA	0.0E+00	1.8E-03	NA	0.0E+00
Dibenzo(a,h)anthracene	1.2E-05	1.0E+01	1.2E-06	1.3E-04	NA	0.0E+00	1.3E-03	NA	0.0E+00
Dibenzofuran	2.2E-06	6.0E+01	3.7E-08	1.6E-05	NA	0.0E+00	3.9E-04	NA	0.0E+00
Diethylphthalate	3.9E-06	3.3E+02	1.2E-08	2.8E-05	NA	0.0E+00	6.3E-04	NA	0.0E+00
Fluoranthene	2.2E-05	1.0E+01	2.2E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Fluorene	5.8E-06	1.0E+01	5.8E-07	6.0E-05	NA	0.0E+00	6.2E-04	NA	0.0E+00
Indeno(1,2,3-cd)pyrene	2.2E-05	1.0E+01	2.2E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Phenanthrene	1.5E-05	1.0E+01	1.5E-06	1.5E-04	NA	0.0E+00	1.6E-03	NA	0.0E+00
Pyrene	2.1E-05	1.0E+01	2.1E-06	2.2E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
bis(2-ethylhexyl)phthalate	1.4E-05	3.5E+00	4.1E-06	1.0E-04	NA	0.0E+00	2.3E-03	NA	0.0E+00
Aroclor-1254	1.2E-03	9.6E-03	1.3E-01	1.6E-02	9.0E-01	1.8E-02	2.9E-03	9.0E-02	3.2E-02
Aroclor-1260	7.8E-04	7.5E-04	1.0E+00	6.9E-03	9.0E-01	7.6E-03	1.2E-03	9.0E-01	1.4E-03
Aluminum	6.7E-01	4.3E+01	1.6E-02	3.6E+00	NA	0.0E+00	7.9E+01	NA	0.0E+00
Cadmium	2.6E-02	2.2E+00	1.2E-02	5.2E-01	1.0E+00	5.2E-01	2.8E+00	1.0E+00	2.8E+00
Vanadium	1.7E-03	8.4E+00	2.0E-04	9.8E-03	1.1E+00	8.9E-03	1.6E-01	1.1E+00	1.5E-01
Zinc	1.4E-01	2.0E+01	7.1E-03	2.6E+00	NA	0.0E+00	5.6E+00	NA	0.0E+00
TPH	6.2E-03	NA	0.0E+00	3.5E-02	NA	0.0E+00	1.2E+00	NA	0.0E+00
SUMMARY HAZARD INDEX			1.2E+00			5.5E-01			3.0E+00

PDE = Potential Dietary Exposure (mg/kgBW/day) RTV = Reference Toxicity Value (mg/kgBW/day) HQ = Hazard Quotient (calculated by dividing PDE by RTV)

APPENDIX E

MONITORING WELL BORING LOGS

TITLE: NAS WHITING FIELD RI	LOG of WELL: WHF-9-1	BORING NO.
CLIENT: SDIV NAVY		PROJECT NO: 8500-01

CONTRACTOR: GERAGHTY & MILLER		DATE STARTED: NA	COMPLTD: NA
METHOD: MUD-ROTARY	CASE SIZE: 4-INCH	BORING DIA.: 10-INCH	PROTECTION LEVEL: D
TOC ELEV.: 148.80 FT.	MONITOR INST.: NA	TOT DPTH: 117.5FT.	DPTH TO ▽ 82.88 FT.
LOGGED BY: NA	WELL DEVELOPMENT DATE: NA		SITE: WHITING FIELD

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					CLAY-red/brown clay w/ some red/brown fine to medium sand		CL		
15					CLAY-red/white clay w/ somefine to medium sand		CL		
50					SAND-white fine to medium grained sand w/ some red/white clay		SC		
75					CLAY-red/white clay		CH		
90					SAND-white fine to coarse sand w/ some gravel, streaks of clay		SW		
115					CLAY-red/white clay		CH		

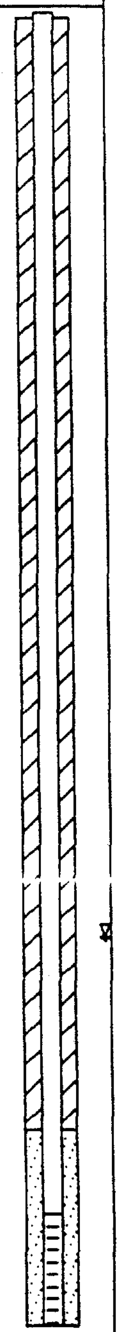

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS WHITING FIELD RI		**LOG of WELL:** WHF-9-2	**BORING NO.**
CLIENT: SDIV NAVY			**PROJECT NO:** 8500-01
CONTRACTOR: WILLIAMS & ASSOC.		**DATE STARTED:** 11-26-90	**COMPLTD:** 12-13-90
METHOD: MUD-ROTARY	**CASE SIZE:** 4-INCH	**BORING DIA.:** 10-INCH	**PROTECTION LEVEL:** D
TOC ELEV.: 181.19 FT.	**MONITOR INST.:** OVA	**TOT DPTH:** 120FT.	**DPTH TO ▽** 96.19 FT.
LOGGED BY: E. BLOMBERG	**WELL DEVELOPMENT DATE:** 1-9-91		**SITE:** WHITING FIELD

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	SOIL CLASS	BLOWS/6-IN
			1.2/1.5		SAND-brown/orange brown fine sand w/ little silt, loose	SP, SP	
5		2	1.0/1.5	0.5	SAND-red orange fine sand w/ little silt, trace clay	SP	4-4-8
10		3	0.8/1.5	0	SAND-red orange fine sand w/ little silt	SP	3-5-7
15		4	1.0/1.5	0	SAND-dark red fine sand w/ little silt, trace clay, dense	SP	7-9-13
20		5	1.1/1.5	0	Same as above	SP	7-10-12
25		6	1.0/1.5	0	Same as above	SP	12-16-18
30		7	0.9/1.5	0	SAND-yellow to white	SP	6-9-10
35		8	1.0/1.5	0	SAND-yellow/white/purple/pink fine sand w/ trace silt, mottled	SP	7-10-10
40		9	1.2/1.5	0	SAND-maroon/purple/white/yellow sand, w/ trace silt, stratified, mottled	SW	8-11-12
45		10	1.1/1.5	0	SAND-pink fine to coarse sand, well graded, loose	SP	12-17-19
50		11	0.6/1.5	0	SAND-white very coarse sand	SP	13-13-13
55		12	0.6/1.5	0	SAND-pink/white fine sand, dense	SP	25-27-37
60		13	0.7/1.5	0	SAND-pink/tan fine to medium sand, dense	SP	22-42-48
65		14	0.4/1.5	0	Same as above	SW	36-50-50/4
70		15	0.5/1.5	0	SAND-pink/yellow fine coarse sand, well graded	SP	24-35-40
75		16	0.3/1.5	0	SAND-pink/tan medium sand w/ some fine sand, dense	SP	36-50/5
80		17	1.4/1.5	0	SAND-orange/pink fine sand w/ little silt	CL	22-32-15
85		18	1.5/1.5	0	CLAY-gray clay w/ some silt, low to moderate plasticity	CL, CH, CH	5-10-15
90		19	1.5/1.5	0	CLAY-purple/gray clay, mottled, good plasticity	CH	7-13-15
95		20	1.5/1.5	0	CLAY-gray/light brown clay, mottled, good plasticity	CH	9-10-18
100		21	0.5/1.5	0	CLAY-purple/gray clay, mottled, good plasticity	SW	35-38-56
105		22	0.5/1.5	0	SAND-lt brown/lt gray fine to medium sand	SP	36-55-
110		23	0.5/1.5	0	SAND-lt red/lt gray, very fine sand	SP	16-31-56
115		24	1.0/1.5	0	SAND-pink/lt brown fine to medium sand w/ trace gravel	SP	29-35-40
120		25	1.0/1.5	4	SAND-lt brown fine sand		25-38-55
125							

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-9-3	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 2/22/93	COMPLTD: 2/25/93
METHOD: MUD ROTARY / CASE SIZE: 2"	SCREEN INT.: 90-105	PROTECTION LEVEL: Modified D
TOC ELEV.: 150.98 FT. / MONITOR INST.: OVA	TOT DPTH: 107FT.	DPTH TO ▽ 97.37 FT.
LOGGED BY: M. Alvarezi / WELL DEVELOPMENT DATE:		SITE: 9

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			18/24	3	SAND - moderate reddish orange, fine, silty sand, dark red orange, dry.		SM	2,8,16,21	
10			18/24	0	SILTY SAND - reddish brown, fine, poorly graded, 1" clay lense, dry.		SM	4,9,5,10	
15			19/24	0	SAND - yellow to dark reddish brown, very fine to fine, some silt, striations, poorly graded, dry		SP	4,4,4,8	
20			24/24	0	SAA		SP	5,4,5,5	
25			24/24	0	SAA, color change to dark purple to pink.		SP	5,4,7,8	
30			24/24	0	SAA, pink, dark purple, to pale yellow.		SP	5,5,7,8	
35			24/24	0	SAND - white pink to yellow, fine to medium, moderately graded, loose, dry.		SP	3,6,8,11	
40				0			SP	6,7,16,14	

ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-9-3	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 2/22/93	COMPLTD: 2/25/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 90-105
PROTECTION LEVEL: Modified D		
TOC ELEV.: 150.98 FT.	MONITOR INST.: OVA	TOT DPTH: 107FT.
DPTH TO ∇ 97.37 FT.		
LOGGED BY: M. Alvarezi	WELL DEVELOPMENT DATE:	SITE: 9

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	SOIL CLASS	BLOWS/6-IN
		18/24		SAND - white, fine, poorly graded, loose, dry.	SP	
45		24/24	0	SAA	SP	7,10,15,16
50		17/24	0	SAA, pink striations.	SP	7,11,17,19
55		20/24	0	SAND - pinkish white, fine to medium, moderately graded, trace clay, loose, dry.	SP	14,13,14,15
60		21/24	0	SAND - white, fine to medium, moderately graded, loose, dry.	SP	20,26,29,37
65		24/24	0	SAND - fine to coarse, trace gravel, well graded, moderately dense, dry.	SP	20,22,30,33
70		24/24	2	SAND - white to pale yellowish orange, fine to coarse, moderately graded, loose, wet (perched water).	SP	20,18,25,29
75		24/24	0	CLAY - gray with reddish purple mottling, fine, plastic, moist.	CL	2,2,2,3
			1	SAA.		7,9,11,14
		24/24	0	SILTY CLAY - pinkish gray, stiff, plastic, moist.		3,4,9,10
80						

WELL DATA

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-9-3		BORING NO.
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.		DATE STARTED: 2/22/93	COMPLTD: 2/25/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 90-105	PROTECTION LEVEL: Modified D
TOC ELEV.: 150.98 FT.	MONITOR INST.: OVA	TOT DPTH: 107FT.	DPTH TO ▽ 97.37 FT.
LOGGED BY: M. Alvarezi	WELL DEVELOPMENT DATE:		SITE: 9

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
85			17/24	0	SAA - gray with purple mottling, 1" sand lense.		CL	4,9,15,12	
90			16/24	0	SAA - no sand lense.		CL	6,11,16,20	
95			15/24	0	SAND - tan, fine, some silt, poorly graded, loose, saturated.		SP	11,13,16,23	
100			14/24	6	SAND - grayish pink, fine to medium, poorly graded, loose, saturated.		SP	19,28,31,37	▽
105			15/24	3	SAA - light tan.		SP	N/A	
110									
115									
120									

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: NAS WHITING FIELD RI	**LOG of WELL:** WHF-10-1	**BORING NO.**
CLIENT: SDIV NAVY		**PROJECT NO:** 8500-01
CONTRACTOR: GERAGHTY & MILLER	**DATE STARTED:** NA	**COMPLTD:** NA
METHOD: MUD-ROTARY	**CASE SIZE:** 4-INCH	**BORING DIA.:** 10-INCH
PROTECTION LEVEL: D		
TOC ELEV.: 148.77 FT.	**MONITOR INST.:** NA	**TOT DPTH:** 117.5FT.
DPTH TO ▽ 84.23 FT.		
LOGGED BY: NA	**WELL DEVELOPMENT DATE:** NA	**SITE:** WHITING FIELD

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0					CLAY-red/brown clay w/ some red/brown fine to medium sand		CL		
15					CLAY-red/white clay w/ some fine to medium sand				
40							SC		
50					SAND-white fine to medium grained sand w/ some red/white clay				
75					CLAY-red/white clay		CH		
90					SAND-white fine to coarse sand w/ some gravel, streaks of clay				
98							SC		
115					CLAY-red/white clay				

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-10-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 3/08/93	COMPLTD: 3/23/93
METHOD: MUD ROTARY / CASE SIZE: 2"	SCREEN INT.: 98-113 FT.	PROTECTION LEVEL: D
TOC ELEV.: 150.83 FT. / MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ∇ 88.6 FT.
LOGGED BY: R. Nelson / WELL DEVELOPMENT DATE:		SITE: 10

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5			12/24	0	SANDY CLAY - reddish brown, poorly graded, dry		SC	3,2,3,3	
10			14/24	0	SAND - orange to red, fine to medium, poorly graded, dry.		SP	3,5,6,9	
15			16/24	0	SANDY CLAY - reddish brown, fine to medium, poorly graded, dry.		SC	14,19,19,29	
20			20/24	2	SILTY SAND - reddish brown, 1/2" clay lense, gray soft, plastic. SAND - yellow, medium, poorly graded, dry.		SM/CH/SP	8,12,14,22	
25			20/24	0	CLAYEY SAND - 5" bands mixed with 3" clay bands, soft, plastic, moist		SC/CH	3,3,4,5	
30			06/24	0	SILTY SAND - yellow to tan, fine, poorly graded, moist.		SM	7,5,6,5	
35			18/24	0	SILTY SAND - SAA, slightly moist, purple bands.		SM	7,7,9,10	
40				1			SM	8,7,10,10	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-10-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 3/08/93	COMPLTD: 3/23/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 98-113 FT.	PROTECTION LEVEL: D
TOC ELEV.: 150.83 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT.	DPTH TO ▽ 88.6 FT.
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:		SITE: 10

Continued from PAGE 1

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			12/24		SILTY SAND - SAA.		SM		
45			18/24	1	SLITY SAND - purppple, white, black, fine, poorly graded, thin clay bands, soft, slightly moist.		SM/CH	6,6,9,14	
50			14/24	N/A	SAND - white to purple, brown bands, fine to medium, poorly graded, moist.		SP	11,19,20,25	
55			12/24	1	SAND - bands of light brown, tan, yellow, and purple, fine to medium, poorly graded, slightly moist.		SP	28,28,33,33	
60			08/24	<1	SAND - light brown, medium, poorly graded, dense, saturated.		SP	38,72,ref	
65			08/24	1	SAND - SAA.		SP	46,61,50+ref	
70			12/24	1	SAND - SAA, trace coarse.		SP	28,43,60,71	
75			14/24	1	SAND - pale yellow to orange to purple, fine, poorly graded, dense, 1/4" clay lense, soft, plastic, trace medium, saturated.		SP	9,23,40,52	
80				0			CL	8,12,12,16	

 ABB ENVIRONMENTAL SERVICES, INC.

TITLE: Naval Air Station Whiting Field	LOG of WELL: WHF-10-2	BORING NO.
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: RI PHASE IIA
CONTRACTOR: Groundwater Protection Inc.	DATE STARTED: 3/08/93	COMPLTD: 3/23/93
METHOD: MUD ROTARY	CASE SIZE: 2"	SCREEN INT.: 95-113 FT
PROTECTION LEVEL: D		
TOC ELEV.: 150.83 FT.	MONITOR INST.: OVA	TOT DPTH: 115FT
DPTH TO ▽ 38.6 FT.		
LOGGED BY: R. Nelson	WELL DEVELOPMENT DATE:	SITE: 10

Continued from PAGE 2

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			24/24		CLAY - gray, medium stiff, moderately plastic, dry, some fine sand.		CL		
			20/24	1	CLAY - purple to gray, plastic, dry, yellow fine sand lense.		CH	14,10,15,16	
85									
90			24/24	0	CLAY - gray, yellow to orange to red mottled, stiff, plastic, dry.		CH	14,12,16,17	
			16/24	1	SAND - (6 in. clay, white to purple, medium plasticity) 10 in. yellow to tan, very fine to fine.		SP	13,28,26,18	
95									
			12/24	3	Same as above.		SP	wr,29,33,35	
100									
			14/24	1	Same as above.		SP	16,21,23,29	
105									
110									
115									
120									

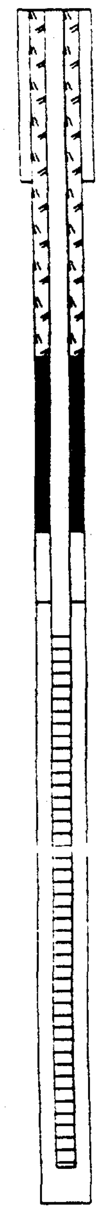

 ABB ENVIRONMENTAL SERVICES, INC.

LITHOLOGIC LOG FOR WELL NUMBER (SITE 9)

Description	Depth (ft)	Thickness (ft)
Clay, red, brown; sand, fine to medium grained, red, brown........................	0 - 15.0	15.0
Clay, red, white; sand, fine to medium grained, white, streaks....................	15.0 - 50.0	35.0
Sand, fine to medium grained, white; clay red, white, streaks.......................	50.0 - 75.0	25.0
Clay, red, white...........................	75.0 - 90.0	15.0
Sand, fine to coarse grained, white; gravel; streaks of clay....................	90.0 - 116.0	26.0
Clay, red, white...........................	116.0 - 120.0	4.0

LITHOLOGIC LOG FOR WELL NUMBER (SITE 10)

Description	Depth (ft)	Thickness (ft)
Clay, red, white, yellow, light gray; sand, fine to medium grained...............	0 - 40.0	40.0
Sand, fine to coarse grained, white; clay, red, white, streaks.......................	40.0 - 75.0	35.0
Clay, red, white, gray.....................	75.0 - 98.0	23.0
Sand, fine to coarse grained, white; clay, red, white, streaks.......................	98.0 - 117.0	19.0

APPENDIX F

SOIL SAMPLE ANALYTICAL DATA

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:		G8876006R				G8876006				G8876007R				G8876007		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09S00101				09S00101				09S00201				09S00201		
Collect Date:		06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Bromomethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Vinyl chloride	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Chloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Methylene chloride	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Acetone	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Carbon disulfide	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1-Dichloroethene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1-Dichloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,2-Dichloroethene (total)	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Chloroform	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,2-Dichloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
2-Butanone	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1,1-Trichloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Carbon tetrachloride	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Bromodichloromethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,2-Dichloropropane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
cis-1,3-Dichloropropene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Trichloroethene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Dibromochloromethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1,2-Trichloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Benzene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
trans-1,3-Dichloropropene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Bromoform	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
4-Methyl-2-pentanone	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
2-Hexanone	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Tetrachloroethene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Toluene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
1,1,2,2-Tetrachloroethane	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Chlorobenzene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Ethylbenzene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Styrene	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
Xylenes (total)	-		ug/kg		11	U	ug/kg	11	-		ug/kg		11	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
bis(2-Chloroethyl) ether	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2-Chlorophenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
1,3-Dichlorobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
1,4-Dichlorobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
1,2-Dichlorobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2-Methylphenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,2-oxybis(1-Chloropropane)	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
4-Methylphenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
N-Nitroso-di-n-propylamine	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Hexachloroethane	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Nitrobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Isophorone	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2-Nitrophenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4-Dimethylphenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876006R				G8876006				G8876007R				G8876007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00101				09S00101				09S00201				09S00201			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4-Dichlorophenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
1,2,4-Trichlorobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Naphthalene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
4-Chloroaniline	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Hexachlorobutadiene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
4-Chloro-3-methylphenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2-Methylnaphthalene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Hexachlorocyclopentadiene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4,6-Trichlorophenol	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4,5-Trichlorophenol	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
2-Chloronaphthalene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2-Nitroaniline	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
Dimethylphthalate	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Acenaphthylene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,6-Dinitrotoluene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
3-Nitroaniline	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
Acenaphthene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4-Dinitrophenol	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
4-Nitrophenol	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
Dibenzofuran	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
2,4-Dinitrotoluene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Diethylphthalate	-		ug/kg		370	UJ	ug/kg	370	-		ug/kg		370	UJ	ug/kg	370
4-Chlorophenyl-phenylether	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Fluorene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
4-Nitroaniline	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
4,6-Dinitro-2-methylphenol	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
N-Nitrosodiphenylamine	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
4-Bromophenyl-phenylether	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Hexachlorobenzene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Pentachlorophenol	-		ug/kg		940	U	ug/kg	940	-		ug/kg		920	U	ug/kg	920
Phenanthrene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Anthracene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Carbazole	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Di-n-butylphthalate	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Fluoranthene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Pyrene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Butylbenzylphthalate	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
3,3-Dichlorobenzidine	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Benzo (a) anthracene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Chrysene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
bis(2-Ethylhexyl) phthalate	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Di-n-octylphthalate	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Benzo (b) fluoranthene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Benzo (k) fluoranthene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Benzo (a) pyrene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Indeno (1,2,3-cd) pyrene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Dibenzo (a,h) anthracene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
Benzo (g,h,i) perylene	-		ug/kg		370	U	ug/kg	370	-		ug/kg		370	U	ug/kg	370
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	1.9	UJ	ug/kg	1.9	-		ug/kg		2	UJ	ug/kg	2	-		ug/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Lab Sample Number:		G8876006R				G8876006				G8876007R				G8876007		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09S00101				09S00101				09S00201				09S00201		
Collect Date:		06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95		
beta-BHC	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
delta-BHC	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
gamma-BHC (Lindane)	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Heptachlor	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Aldrin	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Heptachlor epoxide	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Endosulfan I	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Dieldrin	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
4,4-DDE	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
Endrin	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
Endosulfan II	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
4,4-DDD	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
Endosulfan sulfate	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
4,4-DDT	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
Methoxychlor	19	U	ug/kg	19	-		ug/kg		20	U	ug/kg	20	-		ug/kg	
Endrin ketone	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
Endrin aldehyde	3.7	U	ug/kg	3.7	-		ug/kg		3.8	U	ug/kg	3.8	-		ug/kg	
alpha-Chlordane	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
gamma-Chlordane	1.9	U	ug/kg	1.9	-		ug/kg		2	U	ug/kg	2	-		ug/kg	
Toxaphene	190	U	ug/kg	190	-		ug/kg		200	U	ug/kg	200	-		ug/kg	
Aroclor-1016	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
Aroclor-1221	76	U	ug/kg	76	-		ug/kg		77	U	ug/kg	77	-		ug/kg	
Aroclor-1232	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
Aroclor-1242	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
Aroclor-1248	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
Aroclor-1254	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
Aroclor-1260	37	U	ug/kg	37	-		ug/kg		38	U	ug/kg	38	-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	-		mg/kg		25800		mg/kg	40	-		mg/kg		17500		mg/kg	40
Antimony	-		mg/kg		12	UJ	mg/kg	12	-		mg/kg		8.3	J	mg/kg	12
Arsenic	-		mg/kg		10.1		mg/kg	2	-		mg/kg		4.1		mg/kg	2
Barium	-		mg/kg		7.5	J	mg/kg	40	-		mg/kg		5.5	J	mg/kg	40
Beryllium	-		mg/kg		.11	J	mg/kg	1	-		mg/kg		.08	J	mg/kg	1
Cadmium	-		mg/kg		1	UJ	mg/kg	1	-		mg/kg		1	UJ	mg/kg	1
Calcium	-		mg/kg		1000	UJ	mg/kg	1000	-		mg/kg		1000	UJ	mg/kg	1000
Chromium	-		mg/kg		46.2		mg/kg	2	-		mg/kg		14.9		mg/kg	2
Cobalt	-		mg/kg		10	U	mg/kg	10	-		mg/kg		10	U	mg/kg	10
Copper	-		mg/kg		6.6		mg/kg	5	-		mg/kg		4.5	J	mg/kg	5
Iron	-		mg/kg		29800		mg/kg	20	-		mg/kg		12300		mg/kg	20
Lead	-		mg/kg		4.5		mg/kg	.6	-		mg/kg		6.8		mg/kg	.6
Magnesium	-		mg/kg		104	J	mg/kg	1000	-		mg/kg		73.3	J	mg/kg	1000
Manganese	-		mg/kg		10.1	J	mg/kg	3	-		mg/kg		21	J	mg/kg	3
Mercury	-		mg/kg		.01	J	mg/kg	.1	-		mg/kg		.01	J	mg/kg	.1
Nickel	-		mg/kg		3.9	J	mg/kg	8	-		mg/kg		2.9	J	mg/kg	8
Potassium	-		mg/kg		1000	U	mg/kg	1000	-		mg/kg		1000	U	mg/kg	1000
Selenium	-		mg/kg		1	UJ	mg/kg	1	-		mg/kg		1	UJ	mg/kg	1
Silver	-		mg/kg		2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2
Sodium	-		mg/kg		1000	UJ	mg/kg	1000	-		mg/kg		1000	UJ	mg/kg	1000
Thallium	-		mg/kg		2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2
Vanadium	-		mg/kg		76.7		mg/kg	10	-		mg/kg		32.2		mg/kg	10
Zinc	-		mg/kg		4	UJ	mg/kg	4	-		mg/kg		3.8	J	mg/kg	4

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876006R				G8876006				G8876007R				G8876007			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00101				09S00101				09S00201				09S00201			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	-		mg/kg		.5	U	mg/kg	.5	-		mg/kg		.5	U	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		4.5	U	mg/kg	4.5	-		mg/kg		4.6	U	mg/kg	4.6

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876010				G8876011				G8876008				G8876009			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00301				09S00301D				09S00401				09S00501			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Bromomethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Vinyl chloride	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Chloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Methylene chloride	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Acetone	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Carbon disulfide	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,1-Dichloroethene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,1-Dichloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,2-Dichloroethene (total)	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Chloroform	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,2-Dichloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
2-Butanone	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,1,1-Trichloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Carbon tetrachloride	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Bromodichloromethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,2-Dichloropropane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
cis-1,3-Dichloropropene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Trichloroethene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Dibromochloromethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,1,2-Trichloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Benzene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
trans-1,3-Dichloropropene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Bromoform	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
4-Methyl-2-pentanone	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
2-Hexanone	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Tetrachloroethene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Toluene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Chlorobenzene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Ethylbenzene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Styrene	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
Xylenes (total)	12	U	ug/kg	12	12	U	ug/kg	12	14	U	ug/kg	14	12	U	ug/kg	12
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
bis(2-Chloroethyl) ether	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2-Chlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
1,3-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
1,4-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	120		ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876010				G8876011				G8876008				G8876009			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00301				09S00301D				09S00401				09S00501			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2-Methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,2-oxybis(1-Chloropropane)	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
4-Methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
N-Nitroso-di-n-propylamine	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Hexachloroethane	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Nitrobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Isophorone	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2-Nitrophenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4-Dimethylphenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
bis(2-Chloroethoxy) methane	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4-Dichlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
1,2,4-Trichlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	110	J	ug/kg	400
Naphthalene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
4-Chloroaniline	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Hexachlorobutadiene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
4-Chloro-3-methylphenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2-Methylnaphthalene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Hexachlorocyclopentadiene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4,6-Trichlorophenol	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4,5-Trichlorophenol	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
2-Chloronaphthalene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2-Nitroaniline	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
Dimethylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Acenaphthylene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,6-Dinitrotoluene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
3-Nitroaniline	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
Acenaphthene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4-Dinitrophenol	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
4-Nitrophenol	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
Dibenzofuran	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
2,4-Dinitrotoluene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Diethylphthalate	380	UJ	ug/kg	380	360	UJ	ug/kg	360	470	UJ	ug/kg	470	400	UJ	ug/kg	400
4-Chlorophenyl-phenylether	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Fluorene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
4-Nitroaniline	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
4,6-Dinitro-2-methylphenol	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
N-Nitrosodiphenylamine	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
4-Bromophenyl-phenylether	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Hexachlorobenzene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Pentachlorophenol	960	U	ug/kg	960	900	U	ug/kg	900	1200	U	ug/kg	1200	1000	U	ug/kg	1000
Phenanthrene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Anthracene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Carbazole	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Di-n-butylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Pyrene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Butylbenzylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
3,3-Dichlorobenzidine	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Benzo (a) anthracene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Chrysene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
bis(2-Ethylhexyl) phthalate	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876010				G8876011				G8876008				G8876009			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00301				09S00301D				09S00401				09S00501			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Benzo (b) fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Benzo (k) fluoranthene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Benzo (a) pyrene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Indeno (1,2,3-cd) pyrene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Dibenzo (a,h) anthracene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
Benzo (g,h,i) perylene	380	U	ug/kg	380	360	U	ug/kg	360	470	U	ug/kg	470	400	U	ug/kg	400
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	2	UJ	ug/kg	2	2	UJ	ug/kg	2	2.4	UJ	ug/kg	2.4	2.1	UJ	ug/kg	2.1
beta-BHC	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
delta-BHC	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
gamma-BHC (Lindane)	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Heptachlor	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Aldrin	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Heptachlor epoxide	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Endosulfan I	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Dieldrin	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
4,4-DDE	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
Endrin	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
Endosulfan II	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
4,4-DDD	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
Endosulfan sulfate	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
4,4-DDT	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
Methoxychlor	20	U	ug/kg	20	20	U	ug/kg	20	24	U	ug/kg	24	21	U	ug/kg	21
Endrin ketone	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
Endrin aldehyde	4	U	ug/kg	4	3.9	U	ug/kg	3.9	4.7	U	ug/kg	4.7	4	U	ug/kg	4
alpha-Chlordane	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
gamma-Chlordane	2	U	ug/kg	2	2	U	ug/kg	2	2.4	U	ug/kg	2.4	2.1	U	ug/kg	2.1
Toxaphene	200	U	ug/kg	200	200	U	ug/kg	200	240	U	ug/kg	240	210	U	ug/kg	210
Aroclor-1016	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
Aroclor-1221	81	U	ug/kg	81	79	U	ug/kg	79	96	U	ug/kg	96	82	U	ug/kg	82
Aroclor-1232	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
Aroclor-1242	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
Aroclor-1248	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
Aroclor-1254	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
Aroclor-1260	40	U	ug/kg	40	39	U	ug/kg	39	47	U	ug/kg	47	40	U	ug/kg	40
CLP METALS AND CYANIDE mg/kg																
Aluminum	25200		mg/kg	40	33100		mg/kg	40	29300		mg/kg	40	40	U	mg/kg	40
Antimony	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	8.5		mg/kg	2	7.1		mg/kg	2	10.1		mg/kg	2	2.8		mg/kg	2
Barium	8.9	J	mg/kg	40	21.7	J	mg/kg	40	11.7	J	mg/kg	40	40	U	mg/kg	40
Beryllium	.12	J	mg/kg	1	.22	J	mg/kg	1	.14	J	mg/kg	1	1	U	mg/kg	1
Cadmium	1	UJ	mg/kg	1	1	UJ	mg/kg	1	1	UJ	mg/kg	1	1	UJ	mg/kg	1
Calcium	1000	UJ	mg/kg	1000	384	J	mg/kg	1000	1000	UJ	mg/kg	1000	1000	U	mg/kg	1000
Chromium	21.7		mg/kg	2	29.5		mg/kg	2	31.4		mg/kg	2	2	U	mg/kg	2
Cobalt	.52	J	mg/kg	10	.55	J	mg/kg	10	10	U	mg/kg	10	10	U	mg/kg	10
Copper	5	U	mg/kg	5	9		mg/kg	5	7.5		mg/kg	5	5	U	mg/kg	5
Iron	17800		mg/kg	20	26500		mg/kg	20	23900		mg/kg	20	20	U	mg/kg	20
Lead	11.2		mg/kg	.6	6.6		mg/kg	.6	12.3		mg/kg	.6	3.1		mg/kg	.6
Magnesium	143	J	mg/kg	1000	227	J	mg/kg	1000	147	J	mg/kg	1000	1000	U	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface and Sub-surface Soil Data

Lab Sample Number:	G8876010				G8876011				G8876008				G8876009			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09S00301				09S00301D				09S00401				09S00501			
Collect Date:	06-DEC-95				06-DEC-95				06-DEC-95				06-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	28.2	J	mg/kg	3	52.9	J	mg/kg	3	22.2	J	mg/kg	3	3	UJ	mg/kg	3
Mercury	.01	J	mg/kg	.1	.01	J	mg/kg	.1	.03	J	mg/kg	.1	.1	U	mg/kg	.1
Nickel	8	UJ	mg/kg	8	6.1	J	mg/kg	8	8	UJ	mg/kg	8	8	UJ	mg/kg	8
Potassium	1000	U	mg/kg	1000	212	J	mg/kg	1000	1000	U	mg/kg	1000	1000	U	mg/kg	1000
Selenium	1	UJ	mg/kg	1	1	U	mg/kg	1	1	U	mg/kg	1	1	UJ	mg/kg	1
Silver	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Sodium	1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000	1000	UJ	mg/kg	1000
Thallium	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2	2	U	mg/kg	2
Vanadium	43.5		mg/kg	10	65.1		mg/kg	10	64.7		mg/kg	10	10	U	mg/kg	10
Zinc	6.3		mg/kg	4	14.4		mg/kg	4	6.9		mg/kg	4	4	U	mg/kg	4
Cyanide	.5	U	mg/kg	.5	.5	U	mg/kg	.5	.5	U	mg/kg	.5	.5	U	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	4.7	U	mg/kg	4.7	4.7	U	mg/kg	4.7	5.9	U	mg/kg	5.9	5.7	U	mg/kg	5.7

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462001				22462002				22462003				22462004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-01				10-SL-02				10-SL-03				10-SL-04			
Collect Date:	12-AUG-92				12-AUG-92				12-AUG-92				12-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
Bromomethane	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
Vinyl chloride	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
Chloroethane	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
Methylene chloride	10	UJ	ug/kg	6	11	UJ	ug/kg	6	5	UJ	ug/kg	5	6	UJ	ug/kg	6
Acetone	11	UJ	ug/kg	11	12	UJ	ug/kg	12	11	UJ	ug/kg	11	11	U	ug/kg	11
Carbon disulfide	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1-Dichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,2-Dichloroethene (total)	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Chloroform	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,2-Dichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
2-Butanone	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
1,1,1-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Carbon tetrachloride	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Bromodichloromethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,2-Dichloropropane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
cis-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Trichloroethene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Dibromochloromethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1,2-Trichloroethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Benzene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
trans-1,3-Dichloropropene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Bromoform	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
4-Methyl-2-pentanone	11	U	ug/kg	11	12	U	ug/kg	12	11	U	ug/kg	11	11	U	ug/kg	11
2-Hexanone	11	UJ	ug/kg	11	12	UJ	ug/kg	12	11	UJ	ug/kg	11	11	U	ug/kg	11
Tetrachloroethene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Toluene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Chlorobenzene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Ethylbenzene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Styrene	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	6	U	ug/kg	6
Xylenes (total)	6	U	ug/kg	6	6	U	ug/kg	6	5	U	ug/kg	5	1	J	ug/kg	6
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
bis(2-Chloroethyl) ether	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2-Chlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
1,3-Dichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
1,4-Dichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
1,2-Dichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2-Methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,2-oxybis(1-Chloropropane)	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
4-Methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
N-Nitroso-di-n-propylamine	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Hexachloroethane	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Nitrobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Isophorone	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2-Nitrophenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4-Dimethylphenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462001				22462002				22462003				22462004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-01				10-SL-02				10-SL-03				10-SL-04			
Collect Date:	12-AUG-92				12-AUG-92				12-AUG-92				12-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4-Dichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
1,2,4-Trichlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Naphthalene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
4-Chloroaniline	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Hexachlorobutadiene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
4-Chloro-3-methylphenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2-Methylnaphthalene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Hexachlorocyclopentadiene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4,6-Trichlorophenol	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4,5-Trichlorophenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
2-Chloronaphthalene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2-Nitroaniline	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
Dimethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Acenaphthylene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,6-Dinitrotoluene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
3-Nitroaniline	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
Acenaphthene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4-Dinitrophenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
4-Nitrophenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
Dibenzofuran	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
2,4-Dinitrotoluene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Diethylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	96	J	ug/kg	350	350	U	ug/kg	350
4-Chlorophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Fluorene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
4-Nitroaniline	1800	UJ	ug/kg	1800	1800	UJ	ug/kg	1800	1700	UJ	ug/kg	1700	1700	UJ	ug/kg	1700
4,6-Dinitro-2-methylphenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
N-Nitrosodiphenylamine	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
4-Bromophenyl-phenylether	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Hexachlorobenzene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Pentachlorophenol	1800	U	ug/kg	1800	1800	U	ug/kg	1800	1700	U	ug/kg	1700	1700	U	ug/kg	1700
Phenanthrene	94	J	ug/kg	370	370	U	ug/kg	370	48	J	ug/kg	350	36	J	ug/kg	350
Anthracene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Carbazole	-		ug/kg		-		ug/kg		-		ug/kg		-		ug/kg	
Di-n-butylphthalate	370	UJ	ug/kg	370	370	UJ	ug/kg	370	350	UJ	ug/kg	350	350	UJ	ug/kg	350
Fluoranthene	130	J	ug/kg	370	69	J	ug/kg	370	96	J	ug/kg	350	59	J	ug/kg	350
Pyrene	140	J	ug/kg	370	87	J	ug/kg	370	85	J	ug/kg	350	45	J	ug/kg	350
Butylbenzylphthalate	46	J	ug/kg	370	85	J	ug/kg	370	40	J	ug/kg	350	350	UJ	ug/kg	350
3,3-Dichlorobenzidine	740	U	ug/kg	740	730	U	ug/kg	730	710	U	ug/kg	710	700	U	ug/kg	700
Benzo (a) anthracene	81	J	ug/kg	370	57	J	ug/kg	370	59	J	ug/kg	350	42	J	ug/kg	350
Chrysene	100	J	ug/kg	370	64	J	ug/kg	370	78	J	ug/kg	350	45	J	ug/kg	350
bis(2-Ethylhexyl) phthalate	95	J	ug/kg	370	130	J	ug/kg	370	100	J	ug/kg	350	57	J	ug/kg	350
Di-n-octylphthalate	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Benzo (b) fluoranthene	71	J	ug/kg	370	78	J	ug/kg	370	62	J	ug/kg	350	350	U	ug/kg	350
Benzo (k) fluoranthene	76	J	ug/kg	370	74	J	ug/kg	370	62	J	ug/kg	350	350	U	ug/kg	350
Benzo (a) pyrene	46	J	ug/kg	370	45	J	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Indeno (1,2,3-cd) pyrene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Dibenzo (a,h) anthracene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
Benzo (g,h,i) perylene	370	U	ug/kg	370	370	U	ug/kg	370	350	U	ug/kg	350	350	U	ug/kg	350
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:		22462001				22462002				22462003				22462004		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		10-SL-01				10-SL-02				10-SL-03				10-SL-04		
Collect Date:		12-AUG-92				12-AUG-92				12-AUG-92				12-AUG-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
beta-BHC	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
delta-BHC	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
gamma-BHC (Lindane)	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
Heptachlor	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
Aldrin	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
Heptachlor epoxide	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
Endosulfan I	18	U	ug/kg	18	18	U	ug/kg	18	86	U	ug/kg	86	8.5	U	ug/kg	8.5
Dieldrin	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
4,4-DDE	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
Endrin	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
Endosulfan II	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
4,4-DDD	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
Endosulfan sulfate	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
4,4-DDT	15	J	ug/kg	36	14	J	ug/kg	36	33	J	ug/kg	170	17	U	ug/kg	17
Methoxychlor	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Endrin ketone	36	U	ug/kg	36	36	U	ug/kg	36	170	U	ug/kg	170	17	U	ug/kg	17
Endrin aldehyde	-		ug/kg		-		ug/kg		-		ug/kg		-		ug/kg	
alpha-Chlordane	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
gamma-Chlordane	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Toxaphene	360	U	ug/kg	360	360	U	ug/kg	360	1700	U	ug/kg	1700	170	U	ug/kg	170
Aroclor-1016	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Aroclor-1221	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Aroclor-1232	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Aroclor-1242	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Aroclor-1248	180	U	ug/kg	180	180	U	ug/kg	180	860	U	ug/kg	860	85	U	ug/kg	85
Aroclor-1254	210	J	ug/kg	360	210	J	ug/kg	360	310	J	ug/kg	1700	170	U	ug/kg	170
Aroclor-1260	49	J	ug/kg	360	60	J	ug/kg	360	1700	U	ug/kg	1700	170	U	ug/kg	170
CLP METALS AND CYANIDE mg/kg																
Aluminum	11300		mg/kg	40	21600		mg/kg	40	13500		mg/kg	40	37000		mg/kg	40
Antimony	2.7	U	mg/kg	12	4.2	U	mg/kg	12	2.7	U	mg/kg	12	4.1	U	mg/kg	12
Arsenic	4.1		mg/kg	2	6.9		mg/kg	2	5.4		mg/kg	2	8.8		mg/kg	2
Barium	9	J	mg/kg	40	31.5	J	mg/kg	40	9.7	J	mg/kg	40	17.5	J	mg/kg	40
Beryllium	.14	J	mg/kg	1	.18	J	mg/kg	1	.12	J	mg/kg	1	.21	J	mg/kg	1
Cadmium	.89	J	mg/kg	1	2.4		mg/kg	1	2.3		mg/kg	1	.9	U	mg/kg	1
Calcium	620	J	mg/kg	1000	1620	J	mg/kg	1000	583	J	mg/kg	1000	1720		mg/kg	1000
Chromium	13.2		mg/kg	2	29.9		mg/kg	2	19.4		mg/kg	2	31.9		mg/kg	2
Cobalt	1.4	J	mg/kg	10	2.4	J	mg/kg	10	1.1	J	mg/kg	10	1.8	J	mg/kg	10
Copper	7.4		mg/kg	5	24.2		mg/kg	5	15.8		mg/kg	5	13		mg/kg	5
Iron	10000		mg/kg	20	19600		mg/kg	20	13200		mg/kg	20	23800		mg/kg	20
Lead	19	J	mg/kg	1	47		mg/kg	1	34.1		mg/kg	1	29.3		mg/kg	1
Magnesium	121	J	mg/kg	1000	191	J	mg/kg	1000	96.1	J	mg/kg	1000	294	J	mg/kg	1000
Manganese	41.9		mg/kg	3	70.5		mg/kg	3	389		mg/kg	3	57.1		mg/kg	3
Mercury	.08	U	mg/kg	.1	.12	U	mg/kg	.1	.2		mg/kg	.1	.09	U	mg/kg	.1
Nickel	2.3	U	mg/kg	8	4.9	J	mg/kg	8	4.2	J	mg/kg	8	3.5	J	mg/kg	8
Potassium	132	U	mg/kg	1000	205	U	mg/kg	1000	129	U	mg/kg	1000	198	U	mg/kg	1000
Selenium	.41	U	mg/kg	1	.63	U	mg/kg	1	.4	U	mg/kg	1	.61	U	mg/kg	1
Silver	.33	U	mg/kg	2	.51	U	mg/kg	2	.32	U	mg/kg	2	.49	U	mg/kg	2
Sodium	182	J	mg/kg	1000	290	J	mg/kg	1000	228	J	mg/kg	1000	387	J	mg/kg	1000
Thallium	.45	U	mg/kg	2	.7	U	mg/kg	2	.44	U	mg/kg	2	.68	U	mg/kg	2
Vanadium	25		mg/kg	10	48.1		mg/kg	10	35.7		mg/kg	10	63.4		mg/kg	10
Zinc	23.9	J	mg/kg	4	92.7	J	mg/kg	4	705		mg/kg	4	42.5	J	mg/kg	4

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462001				22462002				22462003				22462004			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-01				10-SL-02				10-SL-03				10-SL-04			
Collect Date:	12-AUG-92				12-AUG-92				12-AUG-92				12-AUG-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	.24	U	mg/kg	1	.37	U	mg/kg	1	.24	U	mg/kg	1	.36	U	mg/kg	1
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:		22462005				22927009				22925001				22925002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		10-SL-05				10SS0201				10SS0302				10SS0302A		
Collect Date:		12-AUG-92				07-OCT-92				07-OCT-92				07-OCT-92		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg															
Chloromethane	11	U	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Bromomethane	11	U	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Vinyl chloride	11	U	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Chloroethane	11	U	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Methylene chloride	8	UJ	ug/kg	6	14	UJ	ug/kg	12	34	UJ	ug/kg	12	25	UJ	ug/kg	12
Acetone	11	UJ	ug/kg	11	25	UJ	ug/kg	12	270	UJ	ug/kg	12	190	UJ	ug/kg	12
Carbon disulfide	6	U	ug/kg	6	2	J	ug/kg	12	3	J	ug/kg	12	2	J	ug/kg	12
1,1-Dichloroethene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
1,1-Dichloroethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloroethene (total)	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Chloroform	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloroethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
2-Butanone	11	U	ug/kg	11	12	U	ug/kg	12	62		ug/kg	12	40		ug/kg	12
1,1,1-Trichloroethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Carbon tetrachloride	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Bromodichloromethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
1,2-Dichloropropane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
cis-1,3-Dichloropropene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Trichloroethene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Dibromochloromethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
1,1,2-Trichloroethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Benzene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
trans-1,3-Dichloropropene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Bromoform	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
4-Methyl-2-pentanone	11	U	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
2-Hexanone	11	UJ	ug/kg	11	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Tetrachloroethene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Toluene	6	U	ug/kg	6	12	U	ug/kg	12	1	J	ug/kg	12	12	U	ug/kg	12
1,1,2,2-Tetrachloroethane	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Chlorobenzene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Ethylbenzene	6	U	ug/kg	6	20		ug/kg	12	4	J	ug/kg	12	2	J	ug/kg	12
Styrene	6	U	ug/kg	6	12	U	ug/kg	12	12	U	ug/kg	12	12	U	ug/kg	12
Xylenes (total)	6	U	ug/kg	6	4	J	ug/kg	12	5	J	ug/kg	12	3	J	ug/kg	12
CLP SEMIVOLATILES 90-SOW	ug/kg															
Phenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
bis(2-Chloroethyl) ether	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2-Chlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
1,3-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
1,4-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462005				22927009				22925001				22925002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-05				10SS0201				10SS0302				10SS0302A			
Collect Date:	12-AUG-92				07-OCT-92				07-OCT-92				07-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,2-oxybis(1-Chloropropane)	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
4-Methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
N-Nitroso-di-n-propylamine	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Hexachloroethane	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Nitrobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
Isophorone	380	U	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
2-Nitrophenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,4-Dimethylphenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
bis(2-Chloroethoxy) methane	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,4-Dichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
1,2,4-Trichlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Naphthalene	380	U	ug/kg	380	160	J	ug/kg	390	240	J	ug/kg	410	260	J	ug/kg	430
4-Chloroaniline	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Hexachlorobutadiene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
4-Chloro-3-methylphenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2-Methylnaphthalene	380	U	ug/kg	380	95	J	ug/kg	390	160	J	ug/kg	410	190	J	ug/kg	430
Hexachlorocyclopentadiene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,4,6-Trichlorophenol	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,4,5-Trichlorophenol	1900	U	ug/kg	1900	940	U	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
2-Chloronaphthalene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2-Nitroaniline	1900	U	ug/kg	1900	940	U	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
Dimethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Acenaphthylene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,6-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
3-Nitroaniline	1900	U	ug/kg	1900	940	U	ug/kg	940	1000	UJ	ug/kg	1000	1000	UJ	ug/kg	1000
Acenaphthene	380	U	ug/kg	380	110	J	ug/kg	390	47	J	ug/kg	410	430	U	ug/kg	430
2,4-Dinitrophenol	1900	U	ug/kg	1900	940	UJ	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
4-Nitrophenol	1900	U	ug/kg	1900	940	UJ	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
Dibenzofuran	380	U	ug/kg	380	82	J	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
2,4-Dinitrotoluene	380	U	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
Diethylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
4-Chlorophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Fluorene	380	U	ug/kg	380	140	J	ug/kg	390	55	J	ug/kg	410	430	U	ug/kg	430
4-Nitroaniline	1900	UJ	ug/kg	1900	940	UJ	ug/kg	940	1000	UJ	ug/kg	1000	1000	UJ	ug/kg	1000
4,6-Dinitro-2-methylphenol	1900	U	ug/kg	1900	940	UJ	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
N-Nitrosodiphenylamine	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
4-Bromophenyl-phenylether	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Hexachlorobenzene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Pentachlorophenol	1900	U	ug/kg	1900	940	U	ug/kg	940	1000	U	ug/kg	1000	1000	U	ug/kg	1000
Phenanthrene	380	U	ug/kg	380	77	J	ug/kg	390	130	J	ug/kg	410	100	J	ug/kg	430
Anthracene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Carbazole	-		ug/kg		390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
Di-n-butylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430
Fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	70	J	ug/kg	410	46	J	ug/kg	430
Pyrene	380	UJ	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	51	J	ug/kg	430
Butylbenzylphthalate	380	UJ	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
3,3-Dichlorobenzidine	770	U	ug/kg	770	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Benzo (a) anthracene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Chrysene	380	UJ	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
bis(2-Ethylhexyl) phthalate	380	UJ	ug/kg	380	390	U	ug/kg	390	410	UJ	ug/kg	410	430	UJ	ug/kg	430

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462005				22927009				22925001				22925002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-05				10SS0201				10SS0302				10SS0302A			
Collect Date:	12-AUG-92				07-OCT-92				07-OCT-92				07-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Benzo (b) fluoranthene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Benzo (k) fluoranthene	380	U	ug/kg	380	390	UJ	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Benzo (a) pyrene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Indeno (1,2,3-cd) pyrene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Dibenzo (a,h) anthracene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
Benzo (g,h,i) perylene	380	U	ug/kg	380	390	U	ug/kg	390	410	U	ug/kg	410	430	U	ug/kg	430
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
beta-BHC	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
delta-BHC	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
gamma-BHC (Lindane)	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Heptachlor	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Aldrin	9.3	U	ug/kg	9.3	3.9	J	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Heptachlor epoxide	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Endosulfan I	9.3	U	ug/kg	9.3	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Dieldrin	19	U	ug/kg	19	5		ug/kg	4	16	U	ug/kg	16	17	U	ug/kg	17
4,4-DDE	19	U	ug/kg	19	9.3		ug/kg	4	16	U	ug/kg	16	17	U	ug/kg	17
Endrin	19	U	ug/kg	19	3.9	U	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
Endosulfan II	19	U	ug/kg	19	3.9	U	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
4,4-DDD	19	U	ug/kg	19	10		ug/kg	4	16	U	ug/kg	16	17	U	ug/kg	17
Endosulfan sulfate	19	U	ug/kg	19	3.9	U	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
4,4-DDT	19	U	ug/kg	19	3.9	J	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
Methoxychlor	93	U	ug/kg	93	20	U	ug/kg	20	85	U	ug/kg	85	88	U	ug/kg	88
Endrin ketone	19	U	ug/kg	19	3.9	U	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
Endrin aldehyde	-		ug/kg		3.9	U	ug/kg	3.9	16	U	ug/kg	16	17	U	ug/kg	17
alpha-Chlordane	93	U	ug/kg	93	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
gamma-Chlordane	93	U	ug/kg	93	2	U	ug/kg	2	8.5	U	ug/kg	8.5	8.8	U	ug/kg	8.8
Toxaphene	190	U	ug/kg	190	200	U	ug/kg	200	850	U	ug/kg	850	880	U	ug/kg	880
Aroclor-1016	93	U	ug/kg	93	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
Aroclor-1221	93	U	ug/kg	93	79	U	ug/kg	79	340	U	ug/kg	340	350	U	ug/kg	350
Aroclor-1232	93	U	ug/kg	93	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
Aroclor-1242	93	U	ug/kg	93	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
Aroclor-1248	93	U	ug/kg	93	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
Aroclor-1254	190	U	ug/kg	190	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
Aroclor-1260	190	U	ug/kg	190	39	U	ug/kg	39	160	U	ug/kg	160	170	U	ug/kg	170
CLP METALS AND CYANIDE mg/kg																
Aluminum	23200		mg/kg	40	12300		mg/kg	40	11300		mg/kg	40	12700		mg/kg	40
Antimony	4.5	U	mg/kg	12	7.9	J	mg/kg	12	3.1	UJ	mg/kg	12	3	UJ	mg/kg	12
Arsenic	6.1		mg/kg	2	1.7	J	mg/kg	2	2.4	J	mg/kg	2	2.5		mg/kg	2
Barium	7.5	J	mg/kg	40	14.6	J	mg/kg	40	13.5	J	mg/kg	40	12.5	J	mg/kg	40
Beryllium	.09	U	mg/kg	1	.4	J	mg/kg	1	.13	J	mg/kg	1	.21	J	mg/kg	1
Cadmium	.99	U	mg/kg	1	.91	J	mg/kg	1	.75	U	mg/kg	1	.71	U	mg/kg	1
Calcium	157	J	mg/kg	1000	4100		mg/kg	1000	729	UJ	mg/kg	1000	1020	UJ	mg/kg	1000
Chromium	21.2		mg/kg	2	207		mg/kg	2	11.9	J	mg/kg	2	13.6	J	mg/kg	2
Cobalt	2.1	J	mg/kg	10	2.5	J	mg/kg	10	.84	U	mg/kg	10	.8	U	mg/kg	10
Copper	6.6	J	mg/kg	5	11.9		mg/kg	5	4.7	J	mg/kg	5	5.5	J	mg/kg	5
Iron	16100		mg/kg	20	44600		mg/kg	20	7270	J	mg/kg	20	7720	J	mg/kg	20
Lead	12.5	J	mg/kg	1	82.4		mg/kg	1	14.3		mg/kg	1	13.4		mg/kg	1
Magnesium	106	J	mg/kg	1000	160	J	mg/kg	1000	130	J	mg/kg	1000	167	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22462005				22927009				22925001				22925002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10-SL-05				10SS0201				10SS0302				10SS0302A			
Collect Date:	12-AUG-92				07-OCT-92				07-OCT-92				07-OCT-92			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	13.1		mg/kg	3	124		mg/kg	3	39.8	J	mg/kg	3	41.6	J	mg/kg	3
Mercury	.14	U	mg/kg	.1	.12	J	mg/kg	.1	.18	UJ	mg/kg	.1	.09	UJ	mg/kg	.1
Nickel	3.9	U	mg/kg	8	4.2	J	mg/kg	8	3.2	UJ	mg/kg	8	3	UJ	mg/kg	8
Potassium	217	U	mg/kg	1000	185	J	mg/kg	1000	171	U	mg/kg	1000	299	J	mg/kg	1000
Selenium	.67	U	mg/kg	1	.49	U	mg/kg	1	.53	UJ	mg/kg	1	.67	J	mg/kg	1
Silver	.54	U	mg/kg	2	1	J	mg/kg	2	.51	U	mg/kg	2	.36	U	mg/kg	2
Sodium	289	J	mg/kg	1000	182	J	mg/kg	1000	208	UJ	mg/kg	1000	210	UJ	mg/kg	1000
Thallium	.74	U	mg/kg	2	.37	U	mg/kg	2	.4	U	mg/kg	2	.38	U	mg/kg	2
Vanadium	41.1		mg/kg	10	104		mg/kg	10	18.8	J	mg/kg	10	20.8	J	mg/kg	10
Zinc	11.3	J	mg/kg	4	27.3		mg/kg	4	21.6		mg/kg	4	17.2		mg/kg	4
Cyanide	.4	U	mg/kg	1	.1	U	mg/kg	1	.11	U	mg/kg	1	.1	U	mg/kg	1
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:		22925001DL				22927010				G8889002				G8889002			
Site		WHITING				WHITING				WHITING				WHITING			
Locator		10SS0302_DL				10SS0503				10S00101				10S00101			
Collect Date:		07-OCT-92				07-OCT-92				07-DEC-95				07-DEC-95			
		VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg																
Chloromethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Bromomethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Vinyl chloride		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Chloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Methylene chloride		50	UJ	ug/kg	25	11	UJ	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Acetone		280	UJ	ug/kg	25	82	UJ	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Carbon disulfide		5	J	ug/kg	25	5	J	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethene (total)		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Chloroform		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
2-Butanone		70		ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,1,1-Trichloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Carbon tetrachloride		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Bromodichloromethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloropropane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
cis-1,3-Dichloropropene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Trichloroethene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Dibromochloromethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,1,2-Trichloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Benzene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
trans-1,3-Dichloropropene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Bromoform		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
4-Methyl-2-pentanone		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
2-Hexanone		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Tetrachloroethene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Toluene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
1,1,2,2-Tetrachloroethane		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Chlorobenzene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Ethylbenzene		5	J	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Styrene		25	U	ug/kg	25	11	U	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
Xylenes (total)		7	J	ug/kg	25	1	J	ug/kg	11	11	U	ug/kg	11	-		ug/kg	
CLP SEMIVOLATILES 90-SOW	ug/kg																
Phenol		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
bis(2-Chloroethyl) ether		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2-Chlorophenol		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
1,3-Dichlorobenzene		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
1,4-Dichlorobenzene		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22925001DL				22927010				G8889002				G8889002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10SS0302_DL				10SS0503				10S00101				10S00101			
Collect Date:	07-OCT-92				07-OCT-92				07-DEC-95				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2-Methylphenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,2-oxybis(1-Chloropropane)	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Methylphenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
N-Nitroso-di-n-propylamine	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Hexachloroethane	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Nitrobenzene	-		ug/kg		370	U	ug/kg	370	370	UJ	ug/kg	370	-		ug/kg	
Isophorone	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2-Nitrophenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4-Dimethylphenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
bis(2-Chloroethoxy) methane	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4-Dichlorophenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
1,2,4-Trichlorobenzene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Naphthalene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Chloroaniline	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Hexachlorobutadiene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Chloro-3-methylphenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2-Methylnaphthalene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Hexachlorocyclopentadiene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4,6-Trichlorophenol	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4,5-Trichlorophenol	-		ug/kg		910	U	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
2-Chloronaphthalene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2-Nitroaniline	-		ug/kg		910	U	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
Dimethylphthalate	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Acenaphthylene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,6-Dinitrotoluene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
3-Nitroaniline	-		ug/kg		910	U	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
Acenaphthene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4-Dinitrophenol	-		ug/kg		910	UJ	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
4-Nitrophenol	-		ug/kg		910	UJ	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
Dibenzofuran	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
2,4-Dinitrotoluene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Diethylphthalate	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Chlorophenyl-phenylether	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Fluorene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Nitroaniline	-		ug/kg		910	UJ	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
4,6-Dinitro-2-methylphenol	-		ug/kg		910	UJ	ug/kg	910	920	U	ug/kg	920	-		ug/kg	
N-Nitrosodiphenylamine	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
4-Bromophenyl-phenylether	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Hexachlorobenzene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Pentachlorophenol	-		ug/kg		910	U	ug/kg	910	920	UJ	ug/kg	920	-		ug/kg	
Phenanthrene	-		ug/kg		370	U	ug/kg	370	280	J	ug/kg	370	-		ug/kg	
Anthracene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Carbazole	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Di-n-butylphthalate	-		ug/kg		370	UJ	ug/kg	380	370	U	ug/kg	370	-		ug/kg	
Fluoranthene	-		ug/kg		370	U	ug/kg	370	660		ug/kg	370	-		ug/kg	
Pyrene	-		ug/kg		370	U	ug/kg	370	580		ug/kg	370	-		ug/kg	
Butylbenzylphthalate	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
3,3-Dichlorobenzidine	-		ug/kg		370	UJ	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Benzo (a) anthracene	-		ug/kg		370	U	ug/kg	370	340		ug/kg	370	-		ug/kg	
Chrysene	-		ug/kg		370	U	ug/kg	370	500		ug/kg	370	-		ug/kg	
bis(2-Ethylhexyl) phthalate	-		ug/kg		370	U	ug/kg	370	200	J	ug/kg	370	-		ug/kg	

Lab Sample Number:	22925001DL				22927010				G8889002				G8889002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10SS0302_DL				10SS0503				10S00101				10S00101			
Collect Date:	07-OCT-92				07-OCT-92				07-DEC-95				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Benzo (b) fluoranthene	-		ug/kg		370	U	ug/kg	370	480		ug/kg	370	-		ug/kg	
Benzo (k) fluoranthene	-		ug/kg		370	UJ	ug/kg	370	360	J	ug/kg	370	-		ug/kg	
Benzo (a) pyrene	-		ug/kg		370	U	ug/kg	370	400		ug/kg	370	-		ug/kg	
Indeno (1,2,3-cd) pyrene	-		ug/kg		370	U	ug/kg	370	180	J	ug/kg	370	-		ug/kg	
Dibenzo (a,h) anthracene	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370	-		ug/kg	
Benzo (g,h,i) perylene	-		ug/kg		370	U	ug/kg	370	180	J	ug/kg	370	-		ug/kg	
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
beta-BHC	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
delta-BHC	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
gamma-BHC (Lindane)	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Heptachlor	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Aldrin	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Heptachlor epoxide	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Endosulfan I	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Dieldrin	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
4,4-DDE	-		ug/kg		.66	J	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
Endrin	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
Endosulfan II	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
4,4-DDD	-		ug/kg		1.4	J	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
Endosulfan sulfate	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
4,4-DDT	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
Methoxychlor	-		ug/kg		19	U	ug/kg	19	94	U	ug/kg	94	-		ug/kg	
Endrin ketone	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
Endrin aldehyde	-		ug/kg		3.7	U	ug/kg	3.7	18	U	ug/kg	18	-		ug/kg	
alpha-Chlordane	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
gamma-Chlordane	-		ug/kg		1.9	U	ug/kg	1.9	9.4	U	ug/kg	9.4	-		ug/kg	
Toxaphene	-		ug/kg		190	U	ug/kg	190	940	U	ug/kg	940	-		ug/kg	
Aroclor-1016	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
Aroclor-1221	-		ug/kg		76	U	ug/kg	76	370	U	ug/kg	370	-		ug/kg	
Aroclor-1232	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
Aroclor-1242	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
Aroclor-1248	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
Aroclor-1254	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
Aroclor-1260	-		ug/kg		37	U	ug/kg	37	180	U	ug/kg	180	-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	-		mg/kg		12400		mg/kg	40	8760		mg/kg	40	-		mg/kg	
Antimony	-		mg/kg		2.8	U	mg/kg	12	12	UJ	mg/kg	12	-		mg/kg	
Arsenic	-		mg/kg		3.7		mg/kg	2	2.5		mg/kg	2	-		mg/kg	
Barium	-		mg/kg		28.2	J	mg/kg	40	361	J	mg/kg	40	-		mg/kg	
Beryllium	-		mg/kg		.16	J	mg/kg	1	1	UJ	mg/kg	1	-		mg/kg	
Cadmium	-		mg/kg		.67	U	mg/kg	1	.91	J	mg/kg	1	-		mg/kg	
Calcium	-		mg/kg		502	J	mg/kg	1000	23200		mg/kg	1000	-		mg/kg	
Chromium	-		mg/kg		11.2		mg/kg	2	18.2		mg/kg	2	-		mg/kg	
Cobalt	-		mg/kg		.75	U	mg/kg	10	.83	J	mg/kg	10	-		mg/kg	
Copper	-		mg/kg		4.5	J	mg/kg	5	7.9		mg/kg	5	-		mg/kg	
Iron	-		mg/kg		7750		mg/kg	20	6520		mg/kg	20	-		mg/kg	
Lead	-		mg/kg		64.8		mg/kg	1	38	J	mg/kg	.6	-		mg/kg	
Magnesium	-		mg/kg		90.9	J	mg/kg	1000	5910		mg/kg	1000	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	22925001DL				22927010				G8889002				G8889002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10SS0302_DL				10SS0503				10S00101				10S00101			
Collect Date:	07-OCT-92				07-OCT-92				07-DEC-95				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	-		mg/kg		13.3		mg/kg	3	56.6	J	mg/kg	3	-		mg/kg	
Mercury	-		mg/kg		.08	J	mg/kg	.1	.07		mg/kg	.1	-		mg/kg	
Nickel	-		mg/kg		1.9	J	mg/kg	8	6.8	J	mg/kg	8	-		mg/kg	
Potassium	-		mg/kg		154	U	mg/kg	1000	219	J	mg/kg	1000	-		mg/kg	
Selenium	-		mg/kg		.47	U	mg/kg	1	1	UJ	mg/kg	1	-		mg/kg	
Silver	-		mg/kg		.46	J	mg/kg	2	2	U	mg/kg	2	-		mg/kg	
Sodium	-		mg/kg		212	J	mg/kg	1000	1000	UJ	mg/kg	1000	-		mg/kg	
Thallium	-		mg/kg		.36	U	mg/kg	2	2	U	mg/kg	2	-		mg/kg	
Vanadium	-		mg/kg		22.7		mg/kg	10	18.9		mg/kg	10	-		mg/kg	
Zinc	-		mg/kg		24.9		mg/kg	4	37.7		mg/kg	4	-		mg/kg	
Cyanide	-		mg/kg		.49	J	mg/kg	1	.1	J	mg/kg	.5	-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		-		mg/kg		-		mg/kg		240		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:		G8889003				G8889003				G8889002R				RA847002		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		10S00101D				10S00101D				10S00101R				10S00201		
Collect Date:		07-DEC-95				07-DEC-95				07-DEC-95				05-JAN-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Bromomethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Vinyl chloride	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Chloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Methylene chloride	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Acetone	11	U	ug/kg	11	-		ug/kg		-		ug/kg		29	UJ	ug/kg	29
Carbon disulfide	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,1-Dichloroethene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,1-Dichloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,2-Dichloroethene (total)	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Chloroform	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,2-Dichloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
2-Butanone	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	UJ	ug/kg	11
1,1,1-Trichloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Carbon tetrachloride	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Bromodichloromethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,2-Dichloropropane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
cis-1,3-Dichloropropene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Trichloroethene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Dibromochloromethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,1,2-Trichloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Benzene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
trans-1,3-Dichloropropene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Bromoform	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
4-Methyl-2-pentanone	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	UJ	ug/kg	11
2-Hexanone	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	UJ	ug/kg	11
Tetrachloroethene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Toluene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
1,1,2,2-Tetrachloroethane	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Chlorobenzene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Ethylbenzene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Styrene	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
Xylenes (total)	11	U	ug/kg	11	-		ug/kg		-		ug/kg		11	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
bis(2-Chloroethyl) ether	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2-Chlorophenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
1,3-Dichlorobenzene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
1,4-Dichlorobenzene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889003				G8889003				G8889002R				RA847002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00101D				10S00101D				10S00101R				10S00201			
Collect Date:	07-DEC-95				07-DEC-95				07-DEC-95				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2-Methylphenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Methylphenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
N-Nitroso-di-n-propylamine	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Hexachloroethane	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Nitrobenzene	360	UJ	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Isophorone	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2-Nitrophenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4-Dimethylphenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
bis(2-Chloroethoxy) methane	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4-Dichlorophenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
1,2,4-Trichlorobenzene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Naphthalene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Chloroaniline	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Hexachlorobutadiene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Chloro-3-methylphenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2-Methylnaphthalene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Hexachlorocyclopentadiene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4,6-Trichlorophenol	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4,5-Trichlorophenol	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
2-Chloronaphthalene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2-Nitroaniline	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
Dimethylphthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Acenaphthylene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,6-Dinitrotoluene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
3-Nitroaniline	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
Acenaphthene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4-Dinitrophenol	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
4-Nitrophenol	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
Dibenzofuran	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
2,4-Dinitrotoluene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Diethylphthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Chlorophenyl-phenylether	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Fluorene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Nitroaniline	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
4,6-Dinitro-2-methylphenol	900	U	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
N-Nitrosodiphenylamine	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
4-Bromophenyl-phenylether	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Hexachlorobenzene	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Pentachlorophenol	900	UJ	ug/kg	900	-		ug/kg		3700	R	ug/kg	3700	950	U	ug/kg	950
Phenanthrene	1200		ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	68	J	ug/kg	380
Anthracene	270	J	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Carbazole	100	J	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Di-n-butylphthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Fluoranthene	2300		ug/kg	360	-		ug/kg		780	R	ug/kg	1500	160	J	ug/kg	380
Pyrene	1600		ug/kg	360	-		ug/kg		680	R	ug/kg	1500	170	J	ug/kg	380
Butylbenzylphthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	57	J	ug/kg	380
3,3-Dichlorobenzidine	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Benzo (a) anthracene	1200		ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	87	J	ug/kg	380
Chrysene	1400		ug/kg	360	-		ug/kg		490	R	ug/kg	1500	120	J	ug/kg	380
bis(2-Ethylhexyl) phthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	3200	R	ug/kg	380

Lab Sample Number:	G8889003				G8889003				G8889002R				RA847002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00101D				10S00101D				10S00101R				10S00201			
Collect Date:	07-DEC-95				07-DEC-95				07-DEC-95				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	360	U	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Benzo (b) fluoranthene	1300		ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	150	J	ug/kg	380
Benzo (k) fluoranthene	900		ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	110	J	ug/kg	380
Benzo (a) pyrene	1000		ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	95	J	ug/kg	380
Indeno (1,2,3-cd) pyrene	360	J	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	58	J	ug/kg	380
Dibenzo (a,h) anthracene	170	J	ug/kg		-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
Benzo (g,h,i) perylene	340	J	ug/kg	360	-		ug/kg		1500	R	ug/kg	1500	380	U	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
beta-BHC	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
delta-BHC	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
gamma-BHC (Lindane)	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Heptachlor	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Aldrin	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Heptachlor epoxide	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Endosulfan I	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Dieldrin	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
4,4-DDE	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
Endrin	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
Endosulfan II	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
4,4-DDD	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
Endosulfan sulfate	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
4,4-DDT	18	U	ug/kg	18	-		ug/kg		-		ug/kg		7	J	ug/kg	4
Methoxychlor	94	U	ug/kg	94	-		ug/kg		-		ug/kg		20	UJ	ug/kg	20
Endrin ketone	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
Endrin aldehyde	18	U	ug/kg	18	-		ug/kg		-		ug/kg		3.8	UJ	ug/kg	3.8
alpha-Chlordane	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
gamma-Chlordane	9.4	U	ug/kg	9.4	-		ug/kg		-		ug/kg		2	UJ	ug/kg	2
Toxaphene	940	U	ug/kg	940	-		ug/kg		-		ug/kg		200	UJ	ug/kg	200
Aroclor-1016	180	U	ug/kg	180	-		ug/kg		-		ug/kg		38	UJ	ug/kg	38
Aroclor-1221	370	U	ug/kg	370	-		ug/kg		-		ug/kg		77	UJ	ug/kg	77
Aroclor-1232	180	U	ug/kg	180	-		ug/kg		-		ug/kg		38	UJ	ug/kg	38
Aroclor-1242	180	U	ug/kg	180	-		ug/kg		-		ug/kg		38	UJ	ug/kg	38
Aroclor-1248	180	U	ug/kg	180	-		ug/kg		-		ug/kg		38	UJ	ug/kg	38
Aroclor-1254	180	U	ug/kg	180	-		ug/kg		-		ug/kg		340	J	ug/kg	38
Aroclor-1260	180	U	ug/kg	180	-		ug/kg		-		ug/kg		38	UJ	ug/kg	38
CLP METALS AND CYANIDE mg/kg																
Aluminum	8920		mg/kg	40	-		mg/kg		-		mg/kg		8960		mg/kg	40
Antimony	12	UJ	mg/kg	12	-		mg/kg		-		mg/kg		12	UJ	mg/kg	12
Arsenic	2.6		mg/kg	2	-		mg/kg		-		mg/kg		3.6		mg/kg	2
Barium	40	UJ	mg/kg	40	-		mg/kg		-		mg/kg		9.2	J	mg/kg	40
Beryllium	.13	J	mg/kg	1	-		mg/kg		-		mg/kg		.1	J	mg/kg	1
Cadmium	1	U	mg/kg	1	-		mg/kg		-		mg/kg		1.4		mg/kg	1
Calcium	17800		mg/kg	1000	-		mg/kg		-		mg/kg		1320		mg/kg	1000
Chromium	16.8		mg/kg	2	-		mg/kg		-		mg/kg		16		mg/kg	2
Cobalt	2	J	mg/kg	10	-		mg/kg		-		mg/kg		.79	J	mg/kg	10
Copper	7.9		mg/kg	5	-		mg/kg		-		mg/kg		10.8		mg/kg	5
Iron	6780		mg/kg	20	-		mg/kg		-		mg/kg		9660		mg/kg	20
Lead	33.1	J	mg/kg	.6	-		mg/kg		-		mg/kg		32.5		mg/kg	.6
Magnesium	5600		mg/kg	1000	-		mg/kg		-		mg/kg		200	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889003				G8889003				G8889002R				RA847002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00101D				10S00101D				10S00101R				10S00201			
Collect Date:	07-DEC-95				07-DEC-95				07-DEC-95				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	66	J	mg/kg	3	-		mg/kg		-		mg/kg		39.3		mg/kg	3
Mercury	.07		mg/kg	.1	-		mg/kg		-		mg/kg		.1	U	mg/kg	.1
Nickel	3	J	mg/kg	8	-		mg/kg		-		mg/kg		2	J	mg/kg	8
Potassium	1000	U	mg/kg	1000	-		mg/kg		-		mg/kg		69.4	J	mg/kg	1000
Selenium	1	UJ	mg/kg	1	-		mg/kg		-		mg/kg		1	UJ	mg/kg	1
Silver	2	U	mg/kg	2	-		mg/kg		-		mg/kg		2	U	mg/kg	2
Sodium	1000	UJ	mg/kg	1000	-		mg/kg		-		mg/kg		181	J	mg/kg	1000
Thallium	2	U	mg/kg	2	-		mg/kg		-		mg/kg		2	U	mg/kg	2
Vanadium	18.7		mg/kg	10	-		mg/kg		-		mg/kg		24.5		mg/kg	10
Zinc	34.1		mg/kg	4	-		mg/kg		-		mg/kg		50		mg/kg	4
Cyanide	.2	J	mg/kg	.5	-		mg/kg		-		mg/kg		.2	J	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		180		mg/kg		-		mg/kg		105		mg/kg	1.8

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	RA847002DL				RA847003				RA847004				RA847004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00201DL				10S00201D				10S00301				10S00301R			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Bromomethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Vinyl chloride	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Chloroethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Methylene chloride	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Acetone	-		ug/kg		20	UJ	ug/kg	20	11	U	ug/kg	11	-		ug/kg	
Carbon disulfide	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,1-Dichloroethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethene (total)	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Chloroform	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloroethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
2-Butanone	-		ug/kg		12	UJ	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,1,1-Trichloroethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Carbon tetrachloride	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Bromodichloromethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,2-Dichloropropane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
cis-1,3-Dichloropropene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Trichloroethene	-		ug/kg		12	U	ug/kg	12	11	UJ	ug/kg	11	-		ug/kg	
Dibromochloromethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,1,2-Trichloroethane	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Benzene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
trans-1,3-Dichloropropene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Bromoform	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
4-Methyl-2-pentanone	-		ug/kg		12	UJ	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
2-Hexanone	-		ug/kg		4	J	ug/kg	12	11	UJ	ug/kg	11	-		ug/kg	
Tetrachloroethene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Toluene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
1,1,2,2-Tetrachloroethane	-		ug/kg		12	U	ug/kg	12	11	UJ	ug/kg	11	-		ug/kg	
Chlorobenzene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Ethylbenzene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Styrene	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
Xylenes (total)	-		ug/kg		12	U	ug/kg	12	11	U	ug/kg	11	-		ug/kg	
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
bis(2-Chloroethyl) ether	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2-Chlorophenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
1,3-Dichlorobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
1,4-Dichlorobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	RA847002DL				RA847003				RA847004				RA847004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00201DL				10S00201D				10S00301				10S00301R			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2-Methylphenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,2-oxybis(1-Chloropropane)	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
4-Methylphenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
N-Nitroso-di-n-propylamine	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Hexachloroethane	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Nitrobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Isophorone	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2-Nitrophenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dimethylphenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
bis(2-Chloroethoxy) methane	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,4-Dichlorophenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
1,2,4-Trichlorobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Naphthalene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
4-Chloroaniline	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorobutadiene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
4-Chloro-3-methylphenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2-Methylnaphthalene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorocyclopentadiene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,4,6-Trichlorophenol	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,4,5-Trichlorophenol	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
2-Chloronaphthalene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2-Nitroaniline	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
Dimethylphthalate	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Acenaphthylene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
2,6-Dinitrotoluene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
3-Nitroaniline	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
Acenaphthene	760	R	ug/kg	760	40	J	ug/kg	380	120	R	ug/kg	380	110	J	ug/kg	380
2,4-Dinitrophenol	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
4-Nitrophenol	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
Dibenzofuran	760	R	ug/kg	760	380	U	ug/kg	380	56	R	ug/kg	380	52	J	ug/kg	380
2,4-Dinitrotoluene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Diethylphthalate	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
4-Chlorophenyl-phenylether	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Fluorene	760	R	ug/kg	760	380	U	ug/kg	380	130	R	ug/kg	380	120	J	ug/kg	380
4-Nitroaniline	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
4,6-Dinitro-2-methylphenol	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
N-Nitrosodiphenylamine	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
4-Bromophenyl-phenylether	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Hexachlorobenzene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Pentachlorophenol	1900	R	ug/kg	1900	970	U	ug/kg	970	950	R	ug/kg	950	950	U	ug/kg	950
Phenanthrene	760	R	ug/kg	760	310	J	ug/kg	380	780	R	ug/kg	380	700		ug/kg	380
Anthracene	760	R	ug/kg	760	54	J	ug/kg	380	200	R	ug/kg	380	200	J	ug/kg	380
Carbazole	760	R	ug/kg	760	84	J	ug/kg	380	190	R	ug/kg	380	160	J	ug/kg	380
Di-n-butylphthalate	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Fluoranthene	150	R	ug/kg	760	420		ug/kg	380	1100	R	ug/kg	380	880		ug/kg	380
Pyrene	160	R	ug/kg	760	290	J	ug/kg	380	810	R	ug/kg	380	1000		ug/kg	380
Butylbenzylphthalate	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
3,3-Dichlorobenzidine	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	U	ug/kg	380
Benzo (a) anthracene	78	R	ug/kg	760	190	J	ug/kg	380	500	R	ug/kg	380	490		ug/kg	380
Chrysene	110	R	ug/kg	760	220	J	ug/kg	380	510	R	ug/kg	380	510		ug/kg	380
bis(2-Ethylhexyl) phthalate	3300		ug/kg	760	140	J	ug/kg	380	380	R	ug/kg	380	160	J	ug/kg	380

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	RA847002DL				RA847003				RA847004				RA847004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00201DL				10S00201D				10S00301				10S00301R			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	UJ	ug/kg	380
Benzo (b) fluoranthene	230	R	ug/kg	760	200	J	ug/kg	380	500	R	ug/kg	380	530	J	ug/kg	380
Benzo (k) fluoranthene	760	R	ug/kg	760	210	J	ug/kg	380	410	R	ug/kg	380	420	J	ug/kg	380
Benzo (a) pyrene	86	R	ug/kg	760	150	J	ug/kg	380	340	R	ug/kg	380	350	J	ug/kg	380
Indeno (1,2,3-cd) pyrene	760	R	ug/kg	760	56	J	ug/kg	380	150	R	ug/kg	380	150	J	ug/kg	380
Dibenzo (a,h) anthracene	760	R	ug/kg	760	380	U	ug/kg	380	110	R	ug/kg		380	UJ	ug/kg	380
Benzo (g,h,i) perylene	760	R	ug/kg	760	380	U	ug/kg	380	380	R	ug/kg	380	380	UJ	ug/kg	380
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
beta-BHC	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
delta-BHC	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
gamma-BHC (Lindane)	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Heptachlor	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Aldrin	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Heptachlor epoxide	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Endosulfan I	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Dieldrin	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
4,4-DDE	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
Endrin	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
Endosulfan II	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
4,4-DDD	-		ug/kg		3.8	U	ug/kg	3.8	4.4	J	ug/kg	4	-		ug/kg	
Endosulfan sulfate	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
4,4-DDT	-		ug/kg		8.9	J	ug/kg	4	3.8	UJ	ug/kg	3.8	-		ug/kg	
Methoxychlor	-		ug/kg		20	U	ug/kg	20	20	UJ	ug/kg	20	-		ug/kg	
Endrin ketone	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
Endrin aldehyde	-		ug/kg		3.8	U	ug/kg	3.8	3.8	UJ	ug/kg	3.8	-		ug/kg	
alpha-Chlordane	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
gamma-Chlordane	-		ug/kg		2	U	ug/kg	2	2	UJ	ug/kg	2	-		ug/kg	
Toxaphene	-		ug/kg		200	U	ug/kg	200	200	UJ	ug/kg	200	-		ug/kg	
Aroclor-1016	-		ug/kg		38	U	ug/kg	38	38	UJ	ug/kg	38	-		ug/kg	
Aroclor-1221	-		ug/kg		78	U	ug/kg	78	77	UJ	ug/kg	77	-		ug/kg	
Aroclor-1232	-		ug/kg		38	U	ug/kg	38	38	UJ	ug/kg	38	-		ug/kg	
Aroclor-1242	-		ug/kg		38	U	ug/kg	38	38	UJ	ug/kg	38	-		ug/kg	
Aroclor-1248	-		ug/kg		38	U	ug/kg	38	38	UJ	ug/kg	38	-		ug/kg	
Aroclor-1254	-		ug/kg		390		ug/kg	38	51	J	ug/kg	38	-		ug/kg	
Aroclor-1260	-		ug/kg		38	U	ug/kg	38	38	UJ	ug/kg	38	-		ug/kg	
CLP METALS AND CYANIDE mg/kg																
Aluminum	-		mg/kg		5890		mg/kg	40	10200		mg/kg	40	-		mg/kg	
Antimony	-		mg/kg		12	UJ	mg/kg	12	12	UJ	mg/kg	12	-		mg/kg	
Arsenic	-		mg/kg		2.4		mg/kg	2	2.7		mg/kg	2	-		mg/kg	
Barium	-		mg/kg		8.1	J	mg/kg	40	24	J	mg/kg	40	-		mg/kg	
Beryllium	-		mg/kg		.06	J	mg/kg	1	.11	J	mg/kg	1	-		mg/kg	
Cadmium	-		mg/kg		1.3		mg/kg	1	.77	J	mg/kg	1	-		mg/kg	
Calcium	-		mg/kg		779	J	mg/kg	1000	1080	J	mg/kg	1000	-		mg/kg	
Chromium	-		mg/kg		12.2		mg/kg	2	11.7		mg/kg	2	-		mg/kg	
Cobalt	-		mg/kg		.82	J	mg/kg	10	10	U	mg/kg	10	-		mg/kg	
Copper	-		mg/kg		11.5		mg/kg	5	11.2		mg/kg	5	-		mg/kg	
Iron	-		mg/kg		8650		mg/kg	20	8880		mg/kg	20	-		mg/kg	
Lead	-		mg/kg		29		mg/kg	.6	47.8		mg/kg	.6	-		mg/kg	
Magnesium	-		mg/kg		100	J	mg/kg	1000	122	J	mg/kg	1000	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	RA847002DL				RA847003				RA847004				RA847004R			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00201DL				10S00201D				10S00301				10S00301R			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	-		mg/kg		36.4		mg/kg	3	41.5		mg/kg	3	-		mg/kg	
Mercury	-		mg/kg		.1	U	mg/kg	.1	.08		mg/kg	.1	-		mg/kg	
Nickel	-		mg/kg		8	U	mg/kg	8	8	U	mg/kg	8	-		mg/kg	
Potassium	-		mg/kg		1000	U	mg/kg	1000	109	J	mg/kg	1000	-		mg/kg	
Selenium	-		mg/kg		1	UJ	mg/kg	1	1	UJ	mg/kg	1	-		mg/kg	
Silver	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2	-		mg/kg	
Sodium	-		mg/kg		192	J	mg/kg	1000	171	J	mg/kg	1000	-		mg/kg	
Thallium	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2	-		mg/kg	
Vanadium	-		mg/kg		20.8		mg/kg	10	24.3		mg/kg	10	-		mg/kg	
Zinc	-		mg/kg		42.9		mg/kg	4	44.8		mg/kg	4	-		mg/kg	
Cyanide	-		mg/kg		.13	J	mg/kg	.5	.13	J	mg/kg	.5	-		mg/kg	
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		66.1		mg/kg	1.8	666		mg/kg	1.8	-		mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889004				G8889004				RA847005				G8889005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00401				10S00401				10S00501				10S00601			
Collect Date:	07-DEC-95				07-DEC-95				05-JAN-96				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/kg																
Chloromethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Bromomethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Vinyl chloride	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Chloroethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Methylene chloride	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Acetone	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Carbon disulfide	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,1-Dichloroethene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,1-Dichloroethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,2-Dichloroethene (total)	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Chloroform	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,2-Dichloroethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
2-Butanone	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,1,1-Trichloroethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Carbon tetrachloride	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Bromodichloromethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,2-Dichloropropane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
cis-1,3-Dichloropropene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Trichloroethene	12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	11	U	ug/kg	11
Dibromochloromethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,1,2-Trichloroethane	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Benzene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
trans-1,3-Dichloropropene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Bromoform	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
4-Methyl-2-pentanone	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
2-Hexanone	12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	11	U	ug/kg	11
Tetrachloroethene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Toluene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
1,1,2,2-Tetrachloroethane	12	U	ug/kg	12	-		ug/kg		11	UJ	ug/kg	11	11	U	ug/kg	11
Chlorobenzene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Ethylbenzene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Styrene	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
Xylenes (total)	12	U	ug/kg	12	-		ug/kg		11	U	ug/kg	11	11	U	ug/kg	11
CLP SEMIVOLATILES 90-SOW ug/kg																
Phenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
bis(2-Chloroethyl) ether	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2-Chlorophenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
1,3-Dichlorobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
1,4-Dichlorobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889004				G8889004				RA847005				G8889005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00401				10S00401				10S00501				10S00601			
Collect Date:	07-DEC-95				07-DEC-95				05-JAN-96				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2-Methylphenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,2-oxybis(1-Chloropropane)	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Methylphenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
N-Nitroso-di-n-propylamine	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Hexachloroethane	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Nitrobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	UJ	ug/kg	370
Isophorone	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2-Nitrophenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4-Dimethylphenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
bis(2-Chloroethoxy) methane	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4-Dichlorophenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
1,2,4-Trichlorobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Naphthalene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Chloroaniline	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Hexachlorobutadiene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Chloro-3-methylphenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2-Methylnaphthalene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Hexachlorocyclopentadiene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4,6-Trichlorophenol	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4,5-Trichlorophenol	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
2-Chloronaphthalene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2-Nitroaniline	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
Dimethylphthalate	1600	UJ	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Acenaphthylene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,6-Dinitrotoluene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
3-Nitroaniline	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
Acenaphthene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4-Dinitrophenol	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
4-Nitrophenol	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
Dibenzofuran	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
2,4-Dinitrotoluene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Diethylphthalate	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Chlorophenyl-phenylether	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Fluorene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Nitroaniline	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
4,6-Dinitro-2-methylphenol	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	U	ug/kg	920
N-Nitrosodiphenylamine	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
4-Bromophenyl-phenylether	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Hexachlorobenzene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Pentachlorophenol	4000	U	ug/kg	4000	-		ug/kg		920	U	ug/kg	920	920	UJ	ug/kg	920
Phenanthrene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Anthracene	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Carbazole	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Di-n-butylphthalate	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Fluoranthene	1400	J	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Pyrene	1800		ug/kg	1600	-		ug/kg		46	J	ug/kg	370	370	U	ug/kg	370
Butylbenzylphthalate	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
3,3-Dichlorobenzidine	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Benzo (a) anthracene	1400	J	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Chrysene	1600	J	ug/kg	1600	-		ug/kg		40	J	ug/kg	370	370	U	ug/kg	370
bis(2-Ethylhexyl) phthalate	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889004				G8889004				RA847005				G8889005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00401				10S00401				10S00501				10S00601			
Collect Date:	07-DEC-95				07-DEC-95				05-JAN-96				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	1600	U	ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Benzo (b) fluoranthene	2500		ug/kg	1600	-		ug/kg		92	J	ug/kg	370	370	U	ug/kg	370
Benzo (k) fluoranthene	2300		ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Benzo (a) pyrene	2500		ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Indeno (1,2,3-cd) pyrene	3200		ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Dibenzo (a,h) anthracene	1000	J	ug/kg		-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
Benzo (g,h,i) perylene	3800		ug/kg	1600	-		ug/kg		370	U	ug/kg	370	370	U	ug/kg	370
CLP PESTICIDES/PCBS 90-SOW ug/kg																
alpha-BHC	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.9	U	ug/kg	1.9
beta-BHC	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.9	U	ug/kg	1.9
delta-BHC	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.9	U	ug/kg	1.9
gamma-BHC (Lindane)	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.9	U	ug/kg	1.9
Heptachlor	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	5.2		ug/kg	2
Aldrin	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.9	U	ug/kg	1.9
Heptachlor epoxide	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	2.4		ug/kg	2
Endosulfan I	10	U	ug/kg	10	-		ug/kg		1.9	UJ	ug/kg	1.9	1.9	U	ug/kg	1.9
Dieldrin	19		ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
4,4-DDE	37		ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
Endrin	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
Endosulfan II	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
4,4-DDD	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
Endosulfan sulfate	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
4,4-DDT	35		ug/kg	20	-		ug/kg		2.1		ug/kg	4	12		ug/kg	4
Methoxychlor	100	U	ug/kg	100	-		ug/kg		19	U	ug/kg	19	19	U	ug/kg	19
Endrin ketone	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
Endrin aldehyde	20	U	ug/kg	20	-		ug/kg		3.7	U	ug/kg	3.7	3.6	U	ug/kg	3.6
alpha-Chlordane	5.2	J	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	1.1	J	ug/kg	2
gamma-Chlordane	10	U	ug/kg	10	-		ug/kg		1.9	U	ug/kg	1.9	6.4		ug/kg	2
Toxaphene	1000	U	ug/kg	1000	-		ug/kg		190	U	ug/kg	190	190	U	ug/kg	190
Aroclor-1016	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
Aroclor-1221	400	U	ug/kg	400	-		ug/kg		74	U	ug/kg	74	74	U	ug/kg	74
Aroclor-1232	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
Aroclor-1242	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
Aroclor-1248	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
Aroclor-1254	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
Aroclor-1260	200	U	ug/kg	200	-		ug/kg		37	U	ug/kg	37	36	U	ug/kg	36
CLP METALS AND CYANIDE mg/kg																
Aluminum	29300		mg/kg	40	-		mg/kg		9740		mg/kg	40	11300		mg/kg	40
Antimony	12	UJ	mg/kg	12	-		mg/kg		12	UJ	mg/kg	12	12	UJ	mg/kg	12
Arsenic	6.1		mg/kg	2	-		mg/kg		3.8		mg/kg	2	3.1		mg/kg	2
Barium	24	J	mg/kg	40	-		mg/kg		8.4	J	mg/kg	40	9.2	J	mg/kg	40
Beryllium	.26	J	mg/kg	1	-		mg/kg		.11	J	mg/kg	1	1	UJ	mg/kg	1
Cadmium	1	U	mg/kg	1	-		mg/kg		.5	J	mg/kg	1	1	U	mg/kg	1
Calcium	1090	J	mg/kg	1000	-		mg/kg		239	J	mg/kg	1000	259	J	mg/kg	1000
Chromium	25		mg/kg	2	-		mg/kg		10.1		mg/kg	2	18		mg/kg	2
Cobalt	1.7	J	mg/kg	10	-		mg/kg		.86	J	mg/kg	10	.93	J	mg/kg	10
Copper	10.4		mg/kg	5	-		mg/kg		5.2	J	mg/kg	5	5	U	mg/kg	5
Iron	19100		mg/kg	20	-		mg/kg		8860		mg/kg	20	9080		mg/kg	20
Lead	25.9	J	mg/kg	.6	-		mg/kg		8.6		mg/kg	.6	9.2	J	mg/kg	.6
Magnesium	397	J	mg/kg	1000	-		mg/kg		77.7	J	mg/kg	1000	123	J	mg/kg	1000

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889004				G8889004				RA847005				G8889005			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10S00401				10S00401				10S00501				10S00601			
Collect Date:	07-DEC-95				07-DEC-95				05-JAN-96				07-DEC-95			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	107	J	mg/kg	3	-		mg/kg		38		mg/kg	3	71.2	J	mg/kg	3
Mercury	.04	J	mg/kg	.1	-		mg/kg		.1	U	mg/kg	.1	.01	J	mg/kg	.1
Nickel	6.5	J	mg/kg	8	-		mg/kg		8	U	mg/kg	8	7	J	mg/kg	8
Potassium	299	J	mg/kg	1000	-		mg/kg		70.5	J	mg/kg	1000	1000	U	mg/kg	1000
Selenium	.29	J	mg/kg	1	-		mg/kg		1	UJ	mg/kg	1	1	UJ	mg/kg	1
Silver	2	U	mg/kg	2	-		mg/kg		2	U	mg/kg	2	2	U	mg/kg	2
Sodium	1000	UJ	mg/kg	1000	-		mg/kg		160	J	mg/kg	1000	1000	UJ	mg/kg	1000
Thallium	2	U	mg/kg	2	-		mg/kg		.13	J	mg/kg	2	2	U	mg/kg	2
Vanadium	49.4		mg/kg	10	-		mg/kg		21.2		mg/kg	10	21.8		mg/kg	10
Zinc	30		mg/kg	4	-		mg/kg		11.2		mg/kg	4	4	U	mg/kg	4
Cyanide	.11	J	mg/kg	.5	-		mg/kg		.12	J	mg/kg	.5	.5	U	mg/kg	.5
Total organic carbon	-		mg/kg		-		mg/kg		-		mg/kg		-		mg/kg	
Total petroleum hydrocarbons	-		mg/kg		56.8		mg/kg		3.3		mg/kg	1.8	-		mg/kg	

Lab Sample Number:		G8889005		
Site		WHITING		
Locator		10S00601		
Collect Date:		07-DEC-95		
	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW	ug/kg			
Chloromethane		-	ug/kg	
Bromomethane		-	ug/kg	
Vinyl chloride		-	ug/kg	
Chloroethane		-	ug/kg	
Methylene chloride		-	ug/kg	
Acetone		-	ug/kg	
Carbon disulfide		-	ug/kg	
1,1-Dichloroethene		-	ug/kg	
1,1-Dichloroethane		-	ug/kg	
1,2-Dichloroethene (total)		-	ug/kg	
Chloroform		-	ug/kg	
1,2-Dichloroethane		-	ug/kg	
2-Butanone		-	ug/kg	
1,1,1-Trichloroethane		-	ug/kg	
Carbon tetrachloride		-	ug/kg	
Bromodichloromethane		-	ug/kg	
1,2-Dichloropropane		-	ug/kg	
cis-1,3-Dichloropropene		-	ug/kg	
Trichloroethene		-	ug/kg	
Dibromochloromethane		-	ug/kg	
1,1,2-Trichloroethane		-	ug/kg	
Benzene		-	ug/kg	
trans-1,3-Dichloropropene		-	ug/kg	
Bromoform		-	ug/kg	
4-Methyl-2-pentanone		-	ug/kg	
2-Hexanone		-	ug/kg	
Tetrachloroethene		-	ug/kg	
Toluene		-	ug/kg	
1,1,2,2-Tetrachloroethane		-	ug/kg	
Chlorobenzene		-	ug/kg	
Ethylbenzene		-	ug/kg	
Styrene		-	ug/kg	
Xylenes (total)		-	ug/kg	
CLP SEMIVOLATILES 90-SOW	ug/kg			
Phenol		-	ug/kg	
bis(2-Chloroethyl) ether		-	ug/kg	
2-Chlorophenol		-	ug/kg	
1,3-Dichlorobenzene		-	ug/kg	
1,4-Dichlorobenzene		-	ug/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:	G8889005			
Site	WHITING			
Locator	10S00601			
Collect Date:	07-DEC-95			
	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene		-	ug/kg	
2-Methylphenol		-	ug/kg	
2,2-oxybis(1-Chloropropane)		-	ug/kg	
4-Methylphenol		-	ug/kg	
N-Nitroso-di-n-propylamine		-	ug/kg	
Hexachloroethane		-	ug/kg	
Nitrobenzene		-	ug/kg	
Isophorone		-	ug/kg	
2-Nitrophenol		-	ug/kg	
2,4-Dimethylphenol		-	ug/kg	
bis(2-Chloroethoxy) methane		-	ug/kg	
2,4-Dichlorophenol		-	ug/kg	
1,2,4-Trichlorobenzene		-	ug/kg	
Naphthalene		-	ug/kg	
4-Chloroaniline		-	ug/kg	
Hexachlorobutadiene		-	ug/kg	
4-Chloro-3-methylphenol		-	ug/kg	
2-Methylnaphthalene		-	ug/kg	
Hexachlorocyclopentadiene		-	ug/kg	
2,4,6-Trichlorophenol		-	ug/kg	
2,4,5-Trichlorophenol		-	ug/kg	
2-Chloronaphthalene		-	ug/kg	
2-Nitroaniline		-	ug/kg	
Dimethylphthalate		-	ug/kg	
Acenaphthylene		-	ug/kg	
2,6-Dinitrotoluene		-	ug/kg	
3-Nitroaniline		-	ug/kg	
Acenaphthene		-	ug/kg	
2,4-Dinitrophenol		-	ug/kg	
4-Nitrophenol		-	ug/kg	
Dibenzofuran		-	ug/kg	
2,4-Dinitrotoluene		-	ug/kg	
Diethylphthalate		-	ug/kg	
4-Chlorophenyl-phenylether		-	ug/kg	
Fluorene		-	ug/kg	
4-Nitroaniline		-	ug/kg	
4,6-Dinitro-2-methylphenol		-	ug/kg	
N-Nitrosodiphenylamine		-	ug/kg	
4-Bromophenyl-phenylether		-	ug/kg	
Hexachlorobenzene		-	ug/kg	
Pentachlorophenol		-	ug/kg	
Phenanthrene		-	ug/kg	
Anthracene		-	ug/kg	
Carbazole		-	ug/kg	
Di-n-butylphthalate		-	ug/kg	
Fluoranthene		-	ug/kg	
Pyrene		-	ug/kg	
Butylbenzylphthalate		-	ug/kg	
3,3-Dichlorobenzidine		-	ug/kg	
Benzo (a) anthracene		-	ug/kg	
Chrysene		-	ug/kg	
bis(2-Ethylhexyl) phthalate		-	ug/kg	

Lab Sample Number:		G8889005		
Site		WHITING		
Locator		10S00601		
Collect Date:		07-DEC-95		
	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate		-	ug/kg	
Benzo (b) fluoranthene		-	ug/kg	
Benzo (k) fluoranthene		-	ug/kg	
Benzo (a) pyrene		-	ug/kg	
Indeno (1,2,3-cd) pyrene		-	ug/kg	
Dibenzo (a,h) anthracene		-	ug/kg	
Benzo (g,h,i) perylene		-	ug/kg	
CLP PESTICIDES/PCBS 90-SOW	ug/kg			
alpha-BHC		-	ug/kg	
beta-BHC		-	ug/kg	
delta-BHC		-	ug/kg	
gamma-BHC (Lindane)		-	ug/kg	
Heptachlor		-	ug/kg	
Aldrin		-	ug/kg	
Heptachlor epoxide		-	ug/kg	
Endosulfan I		-	ug/kg	
Dieldrin		-	ug/kg	
4,4-DDE		-	ug/kg	
Endrin		-	ug/kg	
Endosulfan II		-	ug/kg	
4,4-DDD		-	ug/kg	
Endosulfan sulfate		-	ug/kg	
4,4-DDT		-	ug/kg	
Methoxychlor		-	ug/kg	
Endrin ketone		-	ug/kg	
Endrin aldehyde		-	ug/kg	
alpha-Chlordane		-	ug/kg	
gamma-Chlordane		-	ug/kg	
Toxaphene		-	ug/kg	
Aroclor-1016		-	ug/kg	
Aroclor-1221		-	ug/kg	
Aroclor-1232		-	ug/kg	
Aroclor-1242		-	ug/kg	
Aroclor-1248		-	ug/kg	
Aroclor-1254		-	ug/kg	
Aroclor-1260		-	ug/kg	
CLP METALS AND CYANIDE	mg/kg			
Aluminum		-	mg/kg	
Antimony		-	mg/kg	
Arsenic		-	mg/kg	
Barium		-	mg/kg	
Beryllium		-	mg/kg	
Cadmium		-	mg/kg	
Calcium		-	mg/kg	
Chromium		-	mg/kg	
Cobalt		-	mg/kg	
Copper		-	mg/kg	
Iron		-	mg/kg	
Lead		-	mg/kg	
Magnesium		-	mg/kg	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Soil Data

Lab Sample Number:		G8889005		
Site		WHITING		
Locator		10S00601		
Collect Date:		07-DEC-95		
	VALUE	QUAL	UNITS	DL
Manganese	-		mg/kg	
Mercury	-		mg/kg	
Nickel	-		mg/kg	
Potassium	-		mg/kg	
Selenium	-		mg/kg	
Silver	-		mg/kg	
Sodium	-		mg/kg	
Thallium	-		mg/kg	
Vanadium	-		mg/kg	
Zinc	-		mg/kg	
Cyanide	-		mg/kg	
Total organic carbon	-		mg/kg	
Total petroleum hydrocarbons	54		mg/kg	

APPENDIX G

GROUNDWATER SAMPLE ANALYTICAL DATA

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:		RC016018				RC017012				RC044002				RC045001		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09G00101				09G00101				09G00201				09G00201		
Collect Date:		23-AUG-96				23-AUG-96				26-AUG-96				26-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l																
Chloromethane	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Bromomethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Vinyl chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroethane	10	U	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Methylene chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acetone	10	UJ	ug/l	10	-		ug/l		38	UJ	ug/l	38	-		ug/l	
Carbon disulfide	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethene (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Butanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
1,1,1-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbon tetrachloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromodichloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloropropane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
cis-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Trichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibromochloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzene	10	UJ	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
trans-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromoform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methyl-2-pentanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
2-Hexanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Tetrachloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Toluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Ethylbenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Styrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Xylenes (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP SEMIVOLATILES 90-SOW ug/l																
Phenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Chloroethyl) ether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Chlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,3-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,4-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
N-Nitroso-di-n-propylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Nitrobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Isophorone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitrophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dimethylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:		RC016018				RC017012				RC044002				RC045001		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09G00101				09G00101				09G00201				09G00201		
Collect Date:		23-AUG-96				23-AUG-96				26-AUG-96				26-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2,4-Trichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Naphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloroaniline	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobutadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloro-3-methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylnaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorocyclopentadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,6-Trichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,5-Trichlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
2-Chloronaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dimethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acenaphthylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,6-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Acenaphthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4-Nitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dibenzofuran	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Diethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chlorophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluorene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
N-Nitrosodiphenylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Bromophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pentachlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Phenanthrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbazole	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-butylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Butylbenzylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3,3-Dichlorobenzidine	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Benzo (a) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chrysene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-octylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (b) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (k) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (a) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibenzo (a,h) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (g,h,i) perylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP PESTICIDES/PCBS 90-SOW ug/l																
alpha-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:		RC016018				RC017012				RC044002				RC045001		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09G00101				09G00101				09G00201				09G00201		
Collect Date:		23-AUG-96				23-AUG-96				26-AUG-96				26-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
beta-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
delta-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-BHC (Lindane)	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Aldrin	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor epoxide	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Endosulfan I	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Dieldrin	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDE	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan II	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDD	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan sulfate	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDT	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Methoxychlor	.5	U	ug/l	.5	-		ug/l		.5	U	ug/l	.5	-		ug/l	
Endrin ketone	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin aldehyde	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
alpha-Chlordane	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-Chlordane	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Toxaphene	5	U	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Aroclor-1016	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1221	2	U	ug/l	2	-		ug/l		2	U	ug/l	2	-		ug/l	
Aroclor-1232	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1242	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1248	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1254	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1260	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
CLP METALS AND CYANIDE ug/l																
Aluminum	104	J	ug/l		-		ug/l		3420		ug/l		-		ug/l	
Antimony	10.8	U	ug/l		-		ug/l		8.6	U	ug/l		-		ug/l	
Arsenic	.5	U	ug/l		-		ug/l		3.6	J	ug/l		-		ug/l	
Barium	66.1	J	ug/l		-		ug/l		9.9	J	ug/l		-		ug/l	
Beryllium	.3	U	ug/l		-		ug/l		.3	U	ug/l		-		ug/l	
Cadmium	1.2	U	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	
Calcium	45000		ug/l		-		ug/l		36700		ug/l		-		ug/l	
Chromium	2	U	ug/l		-		ug/l		12.3		ug/l		-		ug/l	
Cobalt	2.3	U	ug/l		-		ug/l		2.3	U	ug/l		-		ug/l	
Copper	1.1	U	ug/l		-		ug/l		1.1	U	ug/l		-		ug/l	
Iron	5	U	ug/l		-		ug/l		5	U	ug/l		-		ug/l	
Lead	.5	U	ug/l		-		ug/l		.5	U	ug/l		-		ug/l	
Magnesium	60.6	J	ug/l		-		ug/l		34	U	ug/l		-		ug/l	
Manganese	1	U	ug/l		-		ug/l		1	U	ug/l		-		ug/l	
Mercury	.1	U	ug/l		-		ug/l		.1	U	ug/l		-		ug/l	
Nickel	7.3	U	ug/l		-		ug/l		7.3	U	ug/l		-		ug/l	
Potassium	13200		ug/l		-		ug/l		3910	J	ug/l		-		ug/l	
Selenium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Silver	2.5	U	ug/l		-		ug/l		2.5	U	ug/l		-		ug/l	
Sodium	4570	J	ug/l		-		ug/l		1420	J	ug/l		-		ug/l	
Thallium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Vanadium	3.2	U	ug/l		-		ug/l		21	J	ug/l		-		ug/l	
Zinc	3	U	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Lab Sample Number:	RC016018				RC017012				RC044002				RC045001			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09G00101				09G00101				09G00201				09G00201			
Collect Date:	23-AUG-96				23-AUG-96				26-AUG-96				26-AUG-96			
Cyanide	1.5	U	ug/l		-		ug/l		2.7	U	ug/l		-		ug/l	
Groundwater Quality mg/l																
Alkalinity as CaCO3	-		mg/l		138		mg/l	10	-		mg/l		94		mg/l	10
Ammonia-N	-		mg/l		.3	U	mg/l	.3	-		mg/l		.3	U	mg/l	.3
Chloride	-		mg/l		10	U	mg/l	10	-		mg/l		10	U	mg/l	10
Hardness as CaCO3	-		mg/l		105		mg/l	10	-		mg/l		85		mg/l	10
Nitrate-Nitrite	-		mg/l		.1	U	mg/l	.1	-		mg/l		.1	U	mg/l	.1
Phosphorous-P, Total	-		mg/l		.1	U	mg/l	.1	-		mg/l		.1	U	mg/l	.1
Sulfate	-		mg/l		.49		mg/l	.1	-		mg/l		9.4		mg/l	.1
Sulfide	-		mg/l		2	U	mg/l	2	-		mg/l		2	U	mg/l	2
Total Dissolved Solids	-		mg/l		136		mg/l	10	-		mg/l		106		mg/l	10
Total Kjeldahl Nitrogen	-		mg/l		.3	U	mg/l	.3	-		mg/l		.3	U	mg/l	.3
Total organic carbon	-		mg/l		1	U	mg/l	1	-		mg/l		1	U	mg/l	1
Total petroleum hydrocarbons	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Methane	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Organic Carbon	-		mg/l		-		mg/l		-		mg/l		-		mg/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:		RC016019				RC017013				RC016020				RC016019		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		09G00301				09G00301				09G00301D				09G00301D		
Collect Date:		23-AUG-96				23-AUG-96				23-AUG-96				23-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l																
Chloromethane	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Bromomethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Vinyl chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroethane	10	UJ	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Methylene chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acetone	46	UJ	ug/l	46	-		ug/l		18	UJ	ug/l	18	-		ug/l	
Carbon disulfide	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethene (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Butanone	2	J	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
1,1,1-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbon tetrachloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromodichloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloropropane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
cis-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Trichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibromochloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzene	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
trans-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromoform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methyl-2-pentanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
2-Hexanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Tetrachloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Toluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Ethylbenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Styrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Xylenes (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP SEMIVOLATILES 90-SOW ug/l																
Phenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
bis(2-Chloroethyl) ether	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2-Chlorophenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
1,3-Dichlorobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
1,4-Dichlorobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:	RC016019				RC017013				RC016020				RC016019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09G00301				09G00301				09G00301D				09G00301D			
Collect Date:	23-AUG-96				23-AUG-96				23-AUG-96				23-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2-Methylphenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Methylphenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
N-Nitroso-di-n-propylamine	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Hexachloroethane	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Nitrobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Isophorone	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2-Nitrophenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4-Dimethylphenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
bis(2-Chloroethoxy) methane	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4-Dichlorophenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
1,2,4-Trichlorobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Naphthalene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Chloroaniline	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Hexachlorobutadiene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Chloro-3-methylphenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2-Methylnaphthalene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Hexachlorocyclopentadiene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4,6-Trichlorophenol	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4,5-Trichlorophenol	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
2-Chloronaphthalene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2-Nitroaniline	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
Dimethylphthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Acenaphthylene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,6-Dinitrotoluene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
3-Nitroaniline	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
Acenaphthene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4-Dinitrophenol	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
4-Nitrophenol	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
Dibenzofuran	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
2,4-Dinitrotoluene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Diethylphthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Chlorophenyl-phenylether	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Fluorene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Nitroaniline	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
N-Nitrosodiphenylamine	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
4-Bromophenyl-phenylether	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Hexachlorobenzene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Pentachlorophenol	25	U	ug/l	25	-		ug/l		-		ug/l		25	U	ug/l	25
Phenanthrene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Anthracene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Carbazole	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Di-n-butylphthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Fluoranthene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Pyrene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Butylbenzylphthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
3,3-Dichlorobenzidine	10	UJ	ug/l	10	-		ug/l		-		ug/l		10	UJ	ug/l	10
Benzo (a) anthracene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Chrysene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:	RC016019				RC017013				RC016020				RC016019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09G00301				09G00301				09G00301D				09G00301D			
Collect Date:	23-AUG-96				23-AUG-96				23-AUG-96				23-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Benzo (b) fluoranthene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Benzo (k) fluoranthene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Benzo (a) pyrene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Dibenzo (a,h) anthracene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
Benzo (g,h,i) perylene	10	U	ug/l	10	-		ug/l		-		ug/l		10	U	ug/l	10
CLP PESTICIDES/PCBS 90-SOW ug/l																
alpha-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
beta-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
delta-BHC	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-BHC (Lindane)	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Aldrin	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor epoxide	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Endosulfan I	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Dieldrin	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDE	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan II	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDD	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan sulfate	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDT	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Methoxychlor	.5	U	ug/l	.5	-		ug/l		.5	U	ug/l	.5	-		ug/l	
Endrin ketone	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin aldehyde	.1	U	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
alpha-Chlordane	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-Chlordane	.05	U	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Toxaphene	5	U	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Aroclor-1016	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1221	2	U	ug/l	2	-		ug/l		2	U	ug/l	2	-		ug/l	
Aroclor-1232	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1242	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1248	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1254	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1260	1	U	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
CLP METALS AND CYANIDE ug/l																
Aluminum	407		ug/l		-		ug/l		372		ug/l		-		ug/l	
Antimony	8.6	U	ug/l		-		ug/l		9.3	U	ug/l		-		ug/l	
Arsenic	2.6	J	ug/l		-		ug/l		2.8	J	ug/l		-		ug/l	
Barium	27.1	J	ug/l		-		ug/l		25.8	J	ug/l		-		ug/l	
Beryllium	.3	U	ug/l		-		ug/l		.3	U	ug/l		-		ug/l	
Cadmium	1.2	U	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	
Calcium	15300		ug/l		-		ug/l		14600		ug/l		-		ug/l	
Chromium	4	J	ug/l		-		ug/l		2.4	J	ug/l		-		ug/l	
Cobalt	2.3	U	ug/l		-		ug/l		2.3	U	ug/l		-		ug/l	
Copper	1.1	U	ug/l		-		ug/l		1.1	U	ug/l		-		ug/l	
Iron	173		ug/l		-		ug/l		148		ug/l		-		ug/l	
Lead	.5	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Magnesium	158	J	ug/l		-		ug/l		160	J	ug/l		-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:	RC016019				RC017013				RC016020				RC016019			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09G00301				09G00301				09G00301D				09G00301D			
Collect Date:	23-AUG-96				23-AUG-96				23-AUG-96				23-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Manganese	1.5	J	ug/l		-		ug/l		1.7	J	ug/l		-		ug/l	
Mercury	.1	U	ug/l		-		ug/l		.1	U	ug/l		-		ug/l	
Nickel	7.3	U	ug/l		-		ug/l		7.3	U	ug/l		-		ug/l	
Potassium	2390	J	ug/l		-		ug/l		2010	J	ug/l		-		ug/l	
Selenium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Silver	2.5	U	ug/l		-		ug/l		2.5	U	ug/l		-		ug/l	
Sodium	2070	J	ug/l		-		ug/l		1950	J	ug/l		-		ug/l	
Thallium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Vanadium	16.4	J	ug/l		-		ug/l		14.3	J	ug/l		-		ug/l	
Zinc	14.8	J	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	
Cyanide	1.5	U	ug/l		-		ug/l		1.5	U	ug/l		-		ug/l	
Groundwater Quality mg/l																
Alkalinity as CaCO3	-		mg/l		43		mg/l	10	-		mg/l		-		mg/l	
Ammonia-N	-		mg/l		.3	U	mg/l	.3	-		mg/l		-		mg/l	
Chloride	-		mg/l		10	U	mg/l	10	-		mg/l		-		mg/l	
Hardness as CaCO3	-		mg/l		37		mg/l	10	-		mg/l		-		mg/l	
Nitrate-Nitrite	-		mg/l		.1	U	mg/l	.1	-		mg/l		-		mg/l	
Phosphorous-P, Total	-		mg/l		.1	U	mg/l	.1	-		mg/l		-		mg/l	
Sulfate	-		mg/l		.76		mg/l	.1	-		mg/l		-		mg/l	
Sulfide	-		mg/l		2	U	mg/l	2	-		mg/l		-		mg/l	
Total Dissolved Solids	-		mg/l		50		mg/l	10	-		mg/l		-		mg/l	
Total Kjeldahl Nitrogen	-		mg/l		.3	U	mg/l	.3	-		mg/l		-		mg/l	
Total organic carbon	-		mg/l		1	U	mg/l	1	-		mg/l		-		mg/l	
Total petroleum hydrocarbons	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Methane	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Organic Carbon	-		mg/l		-		mg/l		-		mg/l		-		mg/l	

Lab Sample Number:		RC016022		
Site		WHITING		
Locator		09G00301F		
Collect Date:		23-AUG-96		
	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l				
Chloromethane		-	ug/l	
Bromomethane		-	ug/l	
Vinyl chloride		-	ug/l	
Chloroethane		-	ug/l	
Methylene chloride		-	ug/l	
Acetone		-	ug/l	
Carbon disulfide		-	ug/l	
1,1-Dichloroethene		-	ug/l	
1,1-Dichloroethane		-	ug/l	
1,2-Dichloroethene (total)		-	ug/l	
Chloroform		-	ug/l	
1,2-Dichloroethane		-	ug/l	
2-Butanone		-	ug/l	
1,1,1-Trichloroethane		-	ug/l	
Carbon tetrachloride		-	ug/l	
Bromodichloromethane		-	ug/l	
1,2-Dichloropropane		-	ug/l	
cis-1,3-Dichloropropene		-	ug/l	
Trichloroethene		-	ug/l	
Dibromochloromethane		-	ug/l	
1,1,2-Trichloroethane		-	ug/l	
Benzene		-	ug/l	
trans-1,3-Dichloropropene		-	ug/l	
Bromoform		-	ug/l	
4-Methyl-2-pentanone		-	ug/l	
2-Hexanone		-	ug/l	
Tetrachloroethene		-	ug/l	
Toluene		-	ug/l	
1,1,2,2-Tetrachloroethane		-	ug/l	
Chlorobenzene		-	ug/l	
Ethylbenzene		-	ug/l	
Styrene		-	ug/l	
Xylenes (total)		-	ug/l	
CLP SEMIVOLATILES 90-SOW ug/l				
Phenol		-	ug/l	
bis(2-Chloroethyl) ether		-	ug/l	
2-Chlorophenol		-	ug/l	
1,3-Dichlorobenzene		-	ug/l	
1,4-Dichlorobenzene		-	ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:		RC016022		
Site		WHITING		
Locator		09G00301F		
Collect Date:		23-AUG-96		
	VALUE	QUAL	UNITS	DL
1,2-Dichlorobenzene		-	ug/l	
2-Methylphenol		-	ug/l	
2,2-oxybis(1-Chloropropane)		-	ug/l	
4-Methylphenol		-	ug/l	
N-Nitroso-di-n-propylamine		-	ug/l	
Hexachloroethane		-	ug/l	
Nitrobenzene		-	ug/l	
Isophorone		-	ug/l	
2-Nitrophenol		-	ug/l	
2,4-Dimethylphenol		-	ug/l	
bis(2-Chloroethoxy) methane		-	ug/l	
2,4-Dichlorophenol		-	ug/l	
1,2,4-Trichlorobenzene		-	ug/l	
Naphthalene		-	ug/l	
4-Chloroaniline		-	ug/l	
Hexachlorobutadiene		-	ug/l	
4-Chloro-3-methylphenol		-	ug/l	
2-Methylnaphthalene		-	ug/l	
Hexachlorocyclopentadiene		-	ug/l	
2,4,6-Trichlorophenol		-	ug/l	
2,4,5-Trichlorophenol		-	ug/l	
2-Chloronaphthalene		-	ug/l	
2-Nitroaniline		-	ug/l	
Dimethylphthalate		-	ug/l	
Acenaphthylene		-	ug/l	
2,6-Dinitrotoluene		-	ug/l	
3-Nitroaniline		-	ug/l	
Acenaphthene		-	ug/l	
2,4-Dinitrophenol		-	ug/l	
4-Nitrophenol		-	ug/l	
Dibenzofuran		-	ug/l	
2,4-Dinitrotoluene		-	ug/l	
Diethylphthalate		-	ug/l	
4-Chlorophenyl-phenylether		-	ug/l	
Fluorene		-	ug/l	
4-Nitroaniline		-	ug/l	
4,6-Dinitro-2-methylphenol		-	ug/l	
N-Nitrosodiphenylamine		-	ug/l	
4-Bromophenyl-phenylether		-	ug/l	
Hexachlorobenzene		-	ug/l	
Pentachlorophenol		-	ug/l	
Phenanthrene		-	ug/l	
Anthracene		-	ug/l	
Carbazole		-	ug/l	
Di-n-butylphthalate		-	ug/l	
Fluoranthene		-	ug/l	
Pyrene		-	ug/l	
Butylbenzylphthalate		-	ug/l	
3,3-Dichlorobenzidine		-	ug/l	
Benzo (a) anthracene		-	ug/l	
Chrysene		-	ug/l	
bis(2-Ethylhexyl) phthalate		-	ug/l	

Lab Sample Number:		RC016022		
Site		WHITING		
Locator		09G00301F		
Collect Date:		23-AUG-96		
	VALUE	QUAL	UNITS	DL
Di-n-octylphthalate	-		ug/l	
Benzo (b) fluoranthene	-		ug/l	
Benzo (k) fluoranthene	-		ug/l	
Benzo (a) pyrene	-		ug/l	
Indeno (1,2,3-cd) pyrene	-		ug/l	
Dibenzo (a,h) anthracene	-		ug/l	
Benzo (g,h,i) perylene	-		ug/l	
CLP PESTICIDES/PCBS 90-SOW ug/l				
alpha-BHC	-		ug/l	
beta-BHC	-		ug/l	
delta-BHC	-		ug/l	
gamma-BHC (Lindane)	-		ug/l	
Heptachlor	-		ug/l	
Aldrin	-		ug/l	
Heptachlor epoxide	-		ug/l	
Endosulfan I	-		ug/l	
Dieldrin	-		ug/l	
4,4-DDE	-		ug/l	
Endrin	-		ug/l	
Endosulfan II	-		ug/l	
4,4-DDD	-		ug/l	
Endosulfan sulfate	-		ug/l	
4,4-DDT	-		ug/l	
Methoxychlor	-		ug/l	
Endrin ketone	-		ug/l	
Endrin aldehyde	-		ug/l	
alpha-Chlordane	-		ug/l	
gamma-Chlordane	-		ug/l	
Toxaphene	-		ug/l	
Aroclor-1016	-		ug/l	
Aroclor-1221	-		ug/l	
Aroclor-1232	-		ug/l	
Aroclor-1242	-		ug/l	
Aroclor-1248	-		ug/l	
Aroclor-1254	-		ug/l	
Aroclor-1260	-		ug/l	
CLP METALS AND CYANIDE ug/l				
Aluminum	289		ug/l	
Antimony	8.6	U	ug/l	
Arsenic	2.4	U	ug/l	
Barium	25.4	J	ug/l	
Beryllium	.3	U	ug/l	
Cadmium	1.2	U	ug/l	
Calcium	14400		ug/l	
Chromium	2.6	J	ug/l	
Cobalt	2.3	U	ug/l	
Copper	1.1	U	ug/l	
Iron	11.3	J	ug/l	
Lead	.5	U	ug/l	
Magnesium	151	J	ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Groundwater Data

Lab Sample Number:	RC016022			
Site	WHITING			
Locator	09G00301F			
Collect Date:	23-AUG-96			
	VALUE	QUAL	UNITS	DL
Manganese	1	U	ug/l	
Mercury	.1	U	ug/l	
Nickel	7.3	U	ug/l	
Potassium	2380	J	ug/l	
Selenium	.6	U	ug/l	
Silver	2.5	U	ug/l	
Sodium	2030	J	ug/l	
Thallium	.6	U	ug/l	
Vanadium	14.1	J	ug/l	
Zinc	4.9	U	ug/l	
Cyanide	-		ug/l	
Groundwater Quality mg/l				
Alkalinity as CaCO3	-		mg/l	
Ammonia-N	-		mg/l	
Chloride	-		mg/l	
Hardness as CaCO3	-		mg/l	
Nitrate-Nitrite	-		mg/l	
Phosphorous-P, Total	-		mg/l	
Sulfate	-		mg/l	
Sulfide	-		mg/l	
Total Dissolved Solids	-		mg/l	
Total Kjeldahl Nitrogen	-		mg/l	
Total organic carbon	-		mg/l	
Total petroleum hydrocarbons	-		mg/l	
Dissolved Methane	-		mg/l	
Dissolved Organic Carbon	-		mg/l	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Groundwater Data

Lab Sample Number:		RC044003				RC045002				RC044004				RC045003		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		10G00101				10G00101				10G00201				10G00201		
Collect Date:		26-AUG-96				26-AUG-96				26-AUG-96				26-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l																
Chloromethane	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Bromomethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Vinyl chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroethane	10	U	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Methylene chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acetone	74	UJ	ug/l	74	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Carbon disulfide	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethene (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Butanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
1,1,1-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbon tetrachloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromodichloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloropropane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
cis-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Trichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibromochloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
trans-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromoform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methyl-2-pentanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
2-Hexanone	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Tetrachloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Toluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Ethylbenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Styrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Xylenes (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP SEMIVOLATILES 90-SOW ug/l																
Phenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Chloroethyl) ether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Chlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,3-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,4-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
N-Nitroso-di-n-propylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Nitrobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Isophorone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitrophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dimethylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Groundwater Data

Lab Sample Number:	RC044003				RC045002				RC044004				RC045003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10G00101				10G00101				10G00201				10G00201			
Collect Date:	26-AUG-96				26-AUG-96				26-AUG-96				26-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2,4-Trichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Naphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloroaniline	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobutadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloro-3-methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylnaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorocyclopentadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,6-Trichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,5-Trichlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
2-Chloronaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dimethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acenaphthylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,6-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Acenaphthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4-Nitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dibenzofuran	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Diethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chlorophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluorene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
N-Nitrosodiphenylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Bromophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pentachlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Phenanthrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbazole	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-butylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Butylbenzylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3,3-Dichlorobenzidine	10	UJ	ug/l	10	-		ug/l		10	UJ	ug/l	10	-		ug/l	
Benzo (a) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chrysene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Ethylhexyl) phthalate	2	J	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-octylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (b) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (k) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (a) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibenzo (a,h) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (g,h,i) perylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP PESTICIDES/PCBS 90-SOW ug/l																
alpha-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Groundwater Data

Lab Sample Number:		RC044003				RC045002				RC044004				RC045003		
Site		WHITING				WHITING				WHITING				WHITING		
Locator		10G00101				10G00101				10G00201				10G00201		
Collect Date:		26-AUG-96				26-AUG-96				26-AUG-96				26-AUG-96		
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
beta-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
delta-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Aldrin	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Heptachlor epoxide	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Endosulfan I	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Dieldrin	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDE	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan II	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDD	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endosulfan sulfate	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
4,4-DDT	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Methoxychlor	.5	UJ	ug/l	.5	-		ug/l		.5	U	ug/l	.5	-		ug/l	
Endrin ketone	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
Endrin aldehyde	.1	UJ	ug/l	.1	-		ug/l		.1	U	ug/l	.1	-		ug/l	
alpha-Chlordane	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
gamma-Chlordane	.05	UJ	ug/l	.05	-		ug/l		.05	U	ug/l	.05	-		ug/l	
Toxaphene	5	UJ	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Aroclor-1016	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1221	2	UJ	ug/l	2	-		ug/l		2	U	ug/l	2	-		ug/l	
Aroclor-1232	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1242	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1248	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1254	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
Aroclor-1260	1	UJ	ug/l	1	-		ug/l		1	U	ug/l	1	-		ug/l	
CLP METALS AND CYANIDE ug/l																
Aluminum	30.9	U	ug/l		-		ug/l		171	U	ug/l		-		ug/l	
Antimony	8.6	U	ug/l		-		ug/l		8.6	U	ug/l		-		ug/l	
Arsenic	.5	U	ug/l		-		ug/l		.5	U	ug/l		-		ug/l	
Barium	16.8	J	ug/l		-		ug/l		11	J	ug/l		-		ug/l	
Beryllium	.3	U	ug/l		-		ug/l		.3	U	ug/l		-		ug/l	
Cadmium	1.2	U	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	
Calcium	1140	J	ug/l		-		ug/l		446	U	ug/l		-		ug/l	
Chromium	2	U	ug/l		-		ug/l		2	U	ug/l		-		ug/l	
Cobalt	2.3	U	ug/l		-		ug/l		2.3	U	ug/l		-		ug/l	
Copper	1.1	U	ug/l		-		ug/l		1.1	U	ug/l		-		ug/l	
Iron	5	U	ug/l		-		ug/l		113		ug/l		-		ug/l	
Lead	.5	U	ug/l		-		ug/l		.5	U	ug/l		-		ug/l	
Magnesium	301	J	ug/l		-		ug/l		355	J	ug/l		-		ug/l	
Manganese	1	U	ug/l		-		ug/l		3.5	J	ug/l		-		ug/l	
Mercury	.1	U	ug/l		-		ug/l		.11	U	ug/l		-		ug/l	
Nickel	7.3	U	ug/l		-		ug/l		7.3	U	ug/l		-		ug/l	
Potassium	2690	J	ug/l		-		ug/l		417	U	ug/l		-		ug/l	
Selenium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Silver	2.5	U	ug/l		-		ug/l		2.5	U	ug/l		-		ug/l	
Sodium	2090	J	ug/l		-		ug/l		2360	J	ug/l		-		ug/l	
Thallium	.6	U	ug/l		-		ug/l		.6	U	ug/l		-		ug/l	
Vanadium	1.2	U	ug/l		-		ug/l		1.2	U	ug/l		-		ug/l	
Zinc	28.6		ug/l		-		ug/l		3.7	U	ug/l		-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 10 Groundwater Data

Lab Sample Number:	RC044003				RC045002				RC044004				RC045003			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	10G00101				10G00101				10G00201				10G00201			
Collect Date:	26-AUG-96				26-AUG-96				26-AUG-96				26-AUG-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	1.8	U	ug/l		-		ug/l		4.5	U	ug/l		-		ug/l	
Total petroleum hydrocarbons	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Groundwater Quality mg/l																
Alkalinity as CaCO3	-		mg/l		10	U	mg/l	10	-		mg/l		10	U	mg/l	10
Ammonia-N	-		mg/l		.3	U	mg/l	.3	-		mg/l		.3	U	mg/l	.3
Chloride	-		mg/l		10	U	mg/l	10	-		mg/l		10	U	mg/l	10
Hardness as CaCO3	-		mg/l		10	U	mg/l	10	-		mg/l		10	U	mg/l	10
Nitrate-Nitrite	-		mg/l		.1	U	mg/l	.1	-		mg/l		.1	U	mg/l	.1
Phosphorous-P, Total	-		mg/l		.1	U	mg/l	.1	-		mg/l		.1	U	mg/l	.1
Sulfate	-		mg/l		.25		mg/l	.1	-		mg/l		.4		mg/l	.1
Sulfide	-		mg/l		2	U	mg/l	2	-		mg/l		2	U	mg/l	2
Total Dissolved Solids	-		mg/l		14		mg/l	10	-		mg/l		10		mg/l	10
Total Kjeldahl Nitrogen	-		mg/l		.3	U	mg/l	.3	-		mg/l		.3	U	mg/l	.3
Total organic carbon	-		mg/l		1	U	mg/l	1	-		mg/l		1	U	mg/l	1
Total petroleum hydrocarbons	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Methane	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Organic Carbon	-		mg/l		-		mg/l		-		mg/l		-		mg/l	

APPENDIX H

SURFACE WATER SAMPLE ANALYTICAL DATA

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface Water Data

Lab Sample Number:	RA903001				RA903001				RA903002				RA903002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09W00101				09W00101				09W00101D				09W00101D			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
CLP VOLATILES 90-SOW ug/l																
Chloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromomethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Vinyl chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Methylene chloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acetone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbon disulfide	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethene (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chloroform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Butanone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,1-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbon tetrachloride	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromodichloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichloropropane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
cis-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Trichloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibromochloromethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,1,2-Trichloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
trans-1,3-Dichloropropene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Bromoform	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methyl-2-pentanone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Hexanone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Tetrachloroethene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Toluene	10	U	ug/l	10	-		ug/l		1	J	ug/l	10	-		ug/l	
1,1,2,2-Tetrachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Ethylbenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Styrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Xylenes (total)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP SEMIVOLATILES 90-SOW ug/l																
Phenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Chloroethyl) ether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Chlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,3-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,4-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2-Dichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,2-oxybis(1-Chloropropane)	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
N-Nitroso-di-n-propylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachloroethane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Nitrobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Isophorone	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitrophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dimethylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface Water Data

Lab Sample Number:	RA903001				RA903001				RA903002				RA903002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09W00101				09W00101				09W00101D				09W00101D			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
bis(2-Chloroethoxy) methane	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
1,2,4-Trichlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Naphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloroaniline	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobutadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chloro-3-methylphenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Methylnaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorocyclopentadiene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,6-Trichlorophenol	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4,5-Trichlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
2-Chloronaphthalene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dimethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Acenaphthylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,6-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Acenaphthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4-Nitrophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Dibenzofuran	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
2,4-Dinitrotoluene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Diethylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Chlorophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluorene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Nitroaniline	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
4,6-Dinitro-2-methylphenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
N-Nitrosodiphenylamine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
4-Bromophenyl-phenylether	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Hexachlorobenzene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pentachlorophenol	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Phenanthrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Carbazole	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-butylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Butylbenzylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
3,3-Dichlorobenzidine	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (a) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Chrysene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
bis(2-Ethylhexyl) phthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Di-n-octylphthalate	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (b) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (k) fluoranthene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (a) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Indeno (1,2,3-cd) pyrene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Dibenzo (a,h) anthracene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Benzo (g,h,i) perylene	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
CLP PESTICIDES/PCBS 90-SOW ug/l																
alpha-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	

Lab Sample Number:	RA903001				RA903001				RA903002				RA903002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09W00101				09W00101				09W00101D				09W00101D			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
beta-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
delta-BHC	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
gamma-BHC (Lindane)	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Heptachlor	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Aldrin	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Heptachlor epoxide	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Endosulfan I	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Dieldrin	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
4,4-DDE	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
Endrin	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
Endosulfan II	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
4,4-DDD	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
Endosulfan sulfate	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
4,4-DDT	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
Methoxychlor	.5	UJ	ug/l	.5	-		ug/l		.5	UJ	ug/l	.5	-		ug/l	
Endrin ketone	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
Endrin aldehyde	.1	UJ	ug/l	.1	-		ug/l		.1	UJ	ug/l	.1	-		ug/l	
alpha-Chlordane	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
gamma-Chlordane	.05	UJ	ug/l	.05	-		ug/l		.05	UJ	ug/l	.05	-		ug/l	
Toxaphene	5	UJ	ug/l	5	-		ug/l		5	UJ	ug/l	5	-		ug/l	
Aroclor-1016	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
Aroclor-1221	2	UJ	ug/l	2	-		ug/l		2	UJ	ug/l	2	-		ug/l	
Aroclor-1232	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
Aroclor-1242	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
Aroclor-1248	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
Aroclor-1254	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
Aroclor-1260	1	UJ	ug/l	1	-		ug/l		1	UJ	ug/l	1	-		ug/l	
CLP METALS AND CYANIDE ug/l																
Aluminum	123	J	ug/l	200	-		ug/l		129	J	ug/l	200	-		ug/l	
Antimony	60	U	ug/l	60	-		ug/l		60	U	ug/l	60	-		ug/l	
Arsenic	.6	J	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Barium	200	UJ	ug/l	200	-		ug/l		200	UJ	ug/l	200	-		ug/l	
Beryllium	5	U	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Cadmium	5	U	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Calcium	760	J	ug/l	5000	-		ug/l		726	J	ug/l	5000	-		ug/l	
Chromium	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Cobalt	50	U	ug/l	50	-		ug/l		50	U	ug/l	50	-		ug/l	
Copper	25	U	ug/l	25	-		ug/l		25	U	ug/l	25	-		ug/l	
Iron	118		ug/l	100	-		ug/l		105		ug/l	100	-		ug/l	
Lead	3	U	ug/l	3	-		ug/l		3	U	ug/l	3	-		ug/l	
Magnesium	234	J	ug/l	5000	-		ug/l		236	J	ug/l	5000	-		ug/l	
Manganese	12.2	J	ug/l	15	-		ug/l		12	J	ug/l	15	-		ug/l	
Mercury	.2	U	ug/l	.2	-		ug/l		.2	U	ug/l	.2	-		ug/l	
Nickel	40	U	ug/l	40	-		ug/l		40	U	ug/l	40	-		ug/l	
Potassium	313	J	ug/l	5000	-		ug/l		298	J	ug/l	5000	-		ug/l	
Selenium	5	U	ug/l	5	-		ug/l		5	U	ug/l	5	-		ug/l	
Silver	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Sodium	904	J	ug/l	5000	-		ug/l		893	J	ug/l	5000	-		ug/l	
Thallium	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Vanadium	50	U	ug/l	50	-		ug/l		50	U	ug/l	50	-		ug/l	
Zinc	20	UJ	ug/l	20	-		ug/l		20	UJ	ug/l	20	-		ug/l	

Naval Air Station Whiting Field, Milton, Florida
Site 9 Surface Water Data

Lab Sample Number:	RA903001				RA903001				RA903002				RA903002			
Site	WHITING				WHITING				WHITING				WHITING			
Locator	09W00101				09W00101				09W00101D				09W00101D			
Collect Date:	05-JAN-96				05-JAN-96				05-JAN-96				05-JAN-96			
	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL	VALUE	QUAL	UNITS	DL
Cyanide	10	U	ug/l	10	-		ug/l		10	U	ug/l	10	-		ug/l	
Total petroleum hydrocarbons	-		mg/l		.06	U	mg/l	.06	-		mg/l		.07	U	mg/l	.07
Groundwater Quality mg/l																
Alkalinity as CaCO3	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Ammonia-N	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Chloride	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Hardness as CaCO3	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Nitrate-Nitrite	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Phosphorous-P, Total	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Sulfate	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Sulfide	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Total Dissolved Solids	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Total Kjeldahl Nitrogen	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Total organic carbon	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Total petroleum hydrocarbons	-		mg/l		.06	U	mg/l	.06	-		mg/l		.07	U	mg/l	.07
Dissolved Methane	-		mg/l		-		mg/l		-		mg/l		-		mg/l	
Dissolved Organic Carbon	-		mg/l		-		mg/l		-		mg/l		-		mg/l	

APPENDIX I

ECOLOGICAL SAMPLE DATA AND FOLMULAS

Appendix I - 1
Statistical Analyses of Biological and Chemical Data
Site 10 Surface Soil

Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit, and Site 10, Southeast Open Disposal Area (A)
Naval Air Station Whiting Field
Milton, Florida

TRPH in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	TRPH Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	85.55	3.2	60
10N0030	666	-5	95
10N0050	3.3	6.2	83

Regression Output:			Regression Output:		
Constant		5.46134	Constant		70.8558
Std Err of Y Est		1.20582	Std Err of Y Est		18.3423
R Squared		0.97837	R Squared		0.46822
No. of Observations		3	No. of Observations		3
Degrees of Freedom		1	Degrees of Freedom		1
X Coefficient(s)	-0.0159		X Coefficient(s)	0.03369	
Std Err of Coef.	0.00236		Std Err of Coef.	0.03591	

Benzo(b)fluoranthene in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	Benzo(b)fluoranthene Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	0.175	3.2	60
10N0030	0.53	-5	95
10N0050	0.092	6.2	83
BKN0030	0.2	8	94
BKN0010	0.18	29	43

Regression Output:			Regression Output:		
Constant		17.3535	Constant		61.2197
Std Err of Y Est		12.4439	Std Err of Y Est		23.6558
R Squared		0.26945	R Squared		0.19055
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-38.545		X Coefficient(s)	58.5398	
Std Err of Coef.	36.6435		Std Err of Coef.	69.6595	

Chrysene in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	Chrysene Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	0.17	3.2	60
10N0030	0.51	-5	95
10N0050	0.04	6.2	83
BKN0030	0.2	8	94
BKN0010	0.18	29	43

Regression Output:			Regression Output:		
Constant		15.6364	Constant		64.0727
Std Err of Y Est		12.9177	Std Err of Y Est		24.3275
R Squared		0.21276	R Squared		0.14393
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-33.438		X Coefficient(s)	49.6694	
Std Err of Coef.	37.1357		Std Err of Coef.	69.9367	

Pyrene in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	Pyrene Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	0.23	3.2	60
10N0030	1	-5	95
10N0050	0.046	6.2	83
BKN0030	0.2	8	94
BKN0010	0.18	29	43

Regression Output:			Regression Output:		
Constant		14.4987	Constant		66.443
Std Err of Y Est		11.997	Std Err of Y Est		23.7173
R Squared		0.32098	R Squared		0.18634
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-18.776		X Coefficient(s)	25.8365	
Std Err of Coef.	15.7671		Std Err of Coef.	31.1707	

4,4-DDT in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	4,4-DDT Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	0.008	3.2	60
10N0030	0.0018	-5	95
10N0050	0.0021	6.2	83
BKN0030	0.0037	8	94
BKN0010	0.0018	29	43

Regression Output:			Regression Output:		
Constant		12.3341	Constant		81.7668
Std Err of Y Est		14.1168	Std Err of Y Est		25.6127
R Squared		0.05982	R Squared		0.0511
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-1165		X Coefficient(s)	-1944.5	
Std Err of Coef.	2666.48		Std Err of Coef.	4837.92	

Aroclor-1254 in Surface Soil versus Earthworm Growth / versus Lettuce Seed Germination

Sample I	Aroclor-1254 Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed (ermination (%) (y)
10N0020	0.365	3.2	60
10N0030	0.051	-5	95
10N0050	0.019	6.2	83

Regression Output:		Regression Output:	
Constant	10.5331	Constant	10.5331
Std Err of Y Est	13.9439	Std Err of Y Est	13.9439
R Squared	0.0827	R Squared	0.0827
No. of Observations	5	No. of Observations	5
Degrees of Freedom	3	Degrees of Freedom	3

BKN0030	0.019	8	94	X Coefficient(s)	-23.868	X Coefficient(s)	-23.868
BKN0010	0.018	29	43	Std Err of Coef.	45.8932	Std Err of Coef.	45.8932

Aluminum in Surface Soil versus Earthworm Growth — versus Lettuce Seed Germination

Sample I	Aluminum Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed ermination (%) (y)
10N0020	7425	3.2	60
10N0030	10200	-5	95
10N0050	9740	6.2	83
BKN0030	5610	8	94
BKN0010	5590	29	43

Regression Output:			Regression Output:		
Constant		39.9126	Constant		35.747
Std Err of Y Est		10.1842	Std Err of Y Est		22.9053
R Squared		0.51068	R Squared		0.2411
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-0.0041		X Coefficient(s)	0.00509	
Std Err of Coef.	0.00232		Std Err of Coef.	0.00521	

Vanadium in Surface Soil versus Earthworm Growth — versus Lettuce Seed Germination

Sample I	Vanadium Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed ermination (%) (y)
10N0020	22.65	3.2	60
10N0030	24.3	-5	95
10N0050	21.2	6.2	83
BKN0030	8.5	8	94
BKN0010	7.5	29	43

Regression Output:			Regression Output:		
Constant		29.1482	Constant		59.9379
Std Err of Y Est		8.72054	Std Err of Y Est		24.9104
R Squared		0.64122	R Squared		0.10242
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-1.2399		X Coefficient(s)	0.89496	
Std Err of Coef.	0.53549		Std Err of Coef.	1.52963	

Zinc in Surface Soil versus Earthworm Growth — versus Lettuce Seed Germination

Sample I	Zinc Surface Soil (mg/kg) (x)	Earthwor Growth (y)	Lettuce Seed ermination (%) (y)
10N0020	46.45	3.2	60
10N0030	11.8	-5	95
10N0050	11.2	6.2	83
BKN0030	4	8	94
BKN0010	2	29	43

Regression Output:			Regression Output:		
Constant		12.6279	Constant		79.1569
Std Err of Y Est		13.2621	Std Err of Y Est		25.6584
R Squared		0.17021	R Squared		0.0477
No. of Observations		5	No. of Observations		5
Degrees of Freedom		3	Degrees of Freedom		3
X Coefficient(s)	-0.2881		X Coefficient(s)	-0.2755	
Std Err of Coef.	0.3673		Std Err of Coef.	0.71061	

Notes:
1/2 of the detection limit is used as a surrogate for non-detect values.

APPENDIX J

SITE-SPECIFIC ARSENIC SOIL CLEANUP GOAL

Appendix J

Evaluation of Background Arsenic Concentrations for Covered Landfill Sites

Naval Air Station (NAS) Whiting Field, Milton, Florida

At NAS Whiting Field nine soil types, as identified by the U. S. Department of Agriculture, Soil Conservation Service (USSCS), are present. The Remedial Investigation (RI) sites at NAS Whiting Field are associated with seven of the nine soil types. The background surface soil data set for each RI site was initially determined to be comprised of background surface soil samples from the same USSCS soil types as occur on the individual sites. However, available information and review of historical aerial photographs indicated that in the construction of landfills at the facility, a borrow pit was dug to an approximate depth of 10 to 15 feet below land surface (bls) and the excavated soil was piled to the side. Following landfill operations, the borrow materials comprised of undifferentiated surface and subsurface soils, were used for the landfill cover. Any additional soils required to complete the landfill cover are believed to have been obtained from other borrow pits located at the facility.

If a mix of surface and subsurface soils were used in the cover for landfills, it would be appropriate to use the combined data set of surface and subsurface soil samples as the background screening value. However in order to be protective of human health and the environment, it is proposed that the background surface and subsurface data set be combined to a single value as be used as the "Industrial Use Soil Cleanup Goal". This modified "Industrial Use Soil Cleanup Goal" is specifically limited to the covered landfill sites including: Site 1, 2, 9, 10, 11, 13, 14, 15, and 16 and to the inorganic analyte arsenic.

Tables 3-8 through 3-18 in the General Information Report present the detected concentrations and summarize the analytical data for the individual background soil samples collected at NAS Whiting Field. A summary of the arsenic background data set and the modified "Industrial Use Soil Cleanup Goal" for arsenic is presented Table G-1. As indicated on the table the modified "Industrial Use Soil Cleanup Goal' for arsenic to be used at covered landfill sites is 4.62 mg/kg.

Table J-1
Summary of Arsenic Detected in Surface and Subsurface Background Soil Samples

Remedial Investigation Report
Site 2, Northwest Open Disposal Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Frequency of Detection Surface Soil Samples[1]	Mean of Detected Concentrations Surface Soil Samples[2]	Frequency of Detection Subsurface Soil Samples[1]	Mean of Detected Concentrations Subsurface Soil Samples[2]	Frequency of Detection Surface and Subsurface Soil Samples[1]	Mean of Detected Concentrations Surface and Subsurface Soil Samples[2]	Surface and Subsurface Soil Background Screening Concentration (modified Industrial Use Cleanup Goal)
<u>Inorganic Analytes</u> (mg/kg)							
Arsenic	15/15	1.54	14/14	3.14	29/29	2.31	4.62

[1] Frequency of detection is the number of samples in which the analyte was detected divided by the total number of samples analyzed.
[2] The mean of detected concentrations is the arithmetic mean of all samples in which the analyte was detected. It does not include those samples in which the analyte was not detected.

Note: mg/kg = milligram per kilogram.

Table J-2
Comparison of Detected Arsenic Concentrations in Surface and Subsurface Soil Samples to Florida Soil Cleanup Goals

Remedial Investigation Report
Site 2, Northwest Open Disposal Area
Naval Air Station Whiting Field
Milton, Florida

Analyte	Minimum Detected Concentration	Maximum Detected Concentration	Mean of Detected Concentrations	Soil Cleanup Goals for Florida (Residential)[1]	Soil Cleanup Goals for Florida (Industrial)[1]	Modified Industrial Use Cleanup Goal[2]
Inorganic Analytes (mg/kg)						
Arsenic	0.52	6.3	2.31	0.8	3.7	4.62

[1] Source: FDEP Memorandum from John Ruddell, Director Division of Waste Management, to District Directors and Waste Program Administrators. Subject: Applicability of Soil Cleanup Goals for Florida, January 19, 1996.
[2] The modified Industrial Use Cleanup Goal for arsenic is twice the mean of detected concentrations in the surface and subsurface soil samples.

Note: mg/kg = milligram per kilogram.

APPENDIX K

COMMENTS AND RESPONSES TO THE DRAFT REMEDIAL INVESTIGATION REPORT, SITES 9 AND 10
NAVAL AIR STATION WHITING FIELD, MILTON, FLORIDA

Response to FDEP Review Comments for
Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit
Site 10, Southeast Open Disposal Area

1. The report utilizes SCGs which were in effect during the time of report preparation. However, because this site may utilize land use restrictions in lieu of cleanup to residential SCGs and because it is appropriate to utilize them for future considerations, I have also used the new Soil Cleanup Goals (SCGs in Chapter 62-785, F.A.C. in order to evaluate the site. In this case, only the residential SCGs for vanadium changed significantly which would affect the evaluation if cleanup to that level were proposed. Please use these SCGs for future site evaluations at NAS Whiting Field

   Response: SCTLs have been incorporated in to the draft FS report for Site 2. These will be presented in the final RI.

2. Based on data presented in the report, risks are predicted for future residents due primarily to arsenic in surface soil. Data presented for surface soil at Site 9 indicates the presence of significant amounts of arsenic (up to 10.1 mg/kg). At Site 10, up to 2,500 ug/kg of benzo(a)pyrene were noted. If the new SCGs were used, vanadium would also contribute significant risk to residents. In the Recommendations, page 9-2, it states that no further action is recommended for Sites 9 and 10 and that a focused feasibility study does not need to be conducted for these sites. Based on the above data, I cannot agree and request that the Navy re-evaluate the recommendations for Sites 9 and 10 and utilize the new SCGs for vanadium in doing so.

   Response: Sites 9 and 10 recommendations will be reevaluated using the new SCTLs. The draft FS has four alternatives: No Action, Site Closure, Hot Spot Removal (LUCs), and Site Closure and Capping (LUCs).

3. Based on a prior presentation to Department Staff and on the summary information furnished by letter to the Department, a request was granted in my letter to you of April 27, 1998 to utilize a site-specific Soil Cleanup Goal for arsenic of 4.62 mg/kg at Sites 1, 2, 9, 10, 11, 12, 13, 14, 15 and 16., with the following conditions:

   A. The sites may be utilized for activities that involve less than full-time contact with the site. This may include, but is not limited to, a.) parks b.) recreation areas that receive heavy use (such as soccer or baseball fields) or, c.)

agricultural sites where farming practices result in moderate site contact (approximately 100 days/year, or less).

B. The Navy must assure adherence to the land use by incorporating the site and conditions in a legally binding land use control agreement.

I suggest that the Navy may want to apply the conditions of the above SCG conditions at Site 9 following the use of using appropriate remedial methods to achieve allowable levels for arsenic.

At Site 10, the Navy should consider applying the same or other appropriate remedial methods to achieve benzo(a)pyrene concentrations at acceptable (industrial scenario, or other appropriate scenario) levels. Following this, the Navy should formulate appropriate land use restrictions for both sites which includes consideration of vanadium levels in surface soils which can be used in a land use restriction agreement.

Reponse: Appropriate remedial methods will be evaluated in the FS taking into account exceedances of SCGs at Sites 9 (arsenic) and 10 (benzo(a)pyrene).

Response to USEPA Review Comments for
Remedial Investigation Report
Site 9, Waste Fuel Disposal Pit
Site 10, Southeast Open Disposal Area

The review of this RI determined that the document is clear, concise and well-written. Furthermore, the RI contains appropriate documentation to support a recommendation of no further action (NFA) at this site. However, several deficiencies and discrepancies were identified in the document.

TECHNICAL REVIEW SPECIFIC COMMENTS

The following specific comments were generated during the review of the RI.

1. **Executive Summary, Page v.** The recommendation in the last paragraph of this page should clearly state that no further action only applies to surface soil, subsurface soil, surface water and sediment. It should also be stated that the evaluation of groundwater will take place in the context of the groundwater operable unit.

   Response: The executive summary will be changed as requested.

2. **Glossary, Page xiv.** The definition for DDE and DDD appear to be the same in the Glossary. Please revise accordingly.

   Response: The glossary will be revised.

3. **Section 3.5, Page 3-4.** Section 3.5 discusses the surface soil assessment conducted for Sites 9 and 10. It does not mention which standards the sample concentrations were compared to. For example in Section 3.6, which discusses the assessment of the subsurface soil, the text states that the, "Subsurface soil samples were compared to USEPA Region III Risk-Based Concentrations (RBCs), Florida Soil Cleanup Goals (FSCGs), and background subsurface soil data." Section 3.5 should be modified to include a similar statement.

   Response: Section 3.5 will be changed accordingly.

4. **Section 4.1, Page 4-1, 4th Paragraph.** In the second paragraph on this page, it states that analysis was performed according to CLP protocol; however, in this paragraph, a reference is made to SW-846 analytical methods.

Response: Each paragraph references different field investigations which used different analytical methods.

4a. How will the discrepancies specifically be addressed?

Response: Text will be added to indicate that different analytical methods were used during each investigation.

5. **Section 4.2.1, Page 4-2, 4th Paragraph.** This paragraph states that the relative percent difference (RPD) criteria for mercury in soil sample 09S00301 failed to meet the 50 percent control limit. However, according to Table 4-1, the RPD for mercury in sample 09S00301 was zero, indicating that it did meet the 50 percent control limit. This discrepancy should be addressed.

Response: This discrepancy will be addressed.

5a. How will the discrepancies specifically be addressed?

Response: Data validation reports will be reviewed to verify the RPD and the correct value will be included in Table 4-1 and the text will be modified if necessary.

6. **Section 4.2.1, Page 4-2, 4th Paragraph.** This paragraph states that the RPD for only one inorganic analyte (chromium) in groundwater sample 09G00301 failed to meet the 30 percent control limit. However, the information contained in Table 4-1 indicates that concentrations of zinc also failed to meet the 30 percent control level. This discrepancy should be addressed.

Response: This discrepancy will be addressed.

6a How will the discrepancies specifically be addressed?

Response: The data validation report will be reviewed and the RPD for zinc will be checked and the text will be modified to include zinc as also failing to meet the 30 percent control limit if necessary.

7. **Section 5.5, Page 5-28, 1st Paragraph.** The text should state how the levels of detected TCL SVOCs compared to federal standards.

Response: The text will be revised accordingly.

8. **Section 5.5, Page 5-28, 3rd Paragraph.** The text should state more clearly which RBC or FSCG category was exceeded for each particular metal. (i.e. residential or industrial standards)

Response: The text will be revised accordingly.

9. **Section 9.2, Page 9-2.** The text should state that the no further action recommendation only applies to surface and subsurface soil, surface water and sediment. Groundwater will be addressed under the groundwater operable unit.

   Response: The text will be revised accordingly.

RISK REVIEW GENERAL COMMENTS

1. The RI Report recommends that Sites 9 and 10 should be considered for no further action (NFA). However, there appear to be data gaps that may need to be resolved before a NFA recommendation could be accepted from a risk assessment perspective. Specifically, groundwater sampling at Sites 9 and 10 may be inadequate to characterize potential contamination at these sites, and no subsurface soil data was collected at Site 9. These potential data gaps are discussed in greater detail in the Section 3.0, Specific Comments.

   Response: These issues will be addressed in the final RI. Groundwater issues at Sites 9 and 10 are being addressed under the Site 40 basewide groundwater investigation. Also see responses to Section 3.0, Specific Comments.

1a. The response does not address how the discrepancy will be resolved for Risk Review Specific Comment No. 1.

   Response: Rationale for not collecting subsurface soil samples has been provided in Section 5.6 (first paragraph) of the RI report. As described in the RI, subsurface soil samples were not collected based on the results of the surface soil samples and lack of evidence of buried wastes from the geophysical survey.

2. In the HHRA, total risks to receptors have not been summed across media. For example, the text states that risks to the future resident from exposure to air, surface soil, groundwater and surface water will be determined, as shown in Figure 6-1. Therefore, to determine the total risks to this receptor, the risks from exposure to surface soil, surface water, groundwater and air should be summed to obtain total excess lifetime cancer risks and a cumulative hazard index (HI). This should be done for each current and future receptor for all media to which each receptor is exposed. This information is needed to help determine if a no further action designation is warranted for these sites.

   Response: The RI recommendation of no further action has changed to prepare a Feasibility Study report. Therefore, risks will not be summed across media to be consistent with the established protocol for previous HHRAs at NAS Whiting Field.

3. This document recommends no further action (NFA) for Sites 9 and 10, as stated in Section 9.2. Total HIs for the child resident at Sites 9 and 10 and for the adult resident at Site 10 are in excess of 1, when considering risks from all media evaluated for those pathways. Also, HIs for some ecological receptors at both sites are well in excess of 1. Therefore, a NFA recommendation appears to be premature based on these results. Further groundwater evaluation including additional rounds of sampling may be warranted to help address risk issues. Also, a more thorough background soil investigation may help address the issue of COPCs which may not be site-related.

   Response: The NFA recommendation will be changed to the recommendation of preparing a Feasibility Study to evaluate remedial alternatives for Sites 9 and 10. The groundwater issue is being addressed in the basewide groundwater investigation of Site 40.

4. The risks to herbivorous birds are not addressed in the ERA. A representative herbivorous bird species should be included as a receptor in the ERA.

   Response: A representative herbivorous bird species will be included in the final ERA.

5. Inhalation and dermal exposure pathways are considered to be insignificant exposure routes and are not evaluated in the ecological risk assessment (ERA). However, inhalation and dermal absorption may be important exposure routes when assessing the total risk from certain chemicals to ground-dwelling species. A brief discussion of the uncertainties that result from not including these exposure pathways in the quantitative assessment of risk should be included in the Uncertainty Analysis (Section 7.7).

   Response: Discussion of the uncertainties of the inhalation and dermal exposure pathways will be included in the Uncertainty Analysis.

5a. The final RI should provide a description of the geophysical investigation and the soil gas survey that were performed at Site 9 as means of clarifying why subsurface soil samples were deemed unnecessary during the remedial investigation.

Response: The rationale for not collecting subsurface soil samples at Site 9 is provided in Section 5.6 of the RI report.

RISK REVIEW SPECIFIC COMMENTS

1. **Section 1.2, Page 1-5**. The test states that standing water (ponding) has been observed in a surface depression at Site 9. However, the next paragraph states, "because the soil at Site 9 is predominantly silty sand, stormwater infiltrates directly into the soil." The apparent discrepancy in these statement should be resolved

   Response: The discrepancy will be resolved.

2. **Section 6.2.3.1, Page 6-4**. The text states that three groundwater samples were collected from Site 9 and references Figure 3-3 and Table 3-3. According to the List of Tables, Chapter 3 does not contain a Table 3-3, and it appears that Table 3-1 was intended. Appropriate changes should be made to the text.

   Response: The text will be revised accordingly.

   In addition, it appears from Figure 3-3 that only monitoring well WHF-9-3 is located within the Site 9 boundaries. According to Figures 5-1 and 5-2, monitoring well WHF-9-1 may be located cross gradient from Site 9, and monitoring well WHF-9-2 is located upgradient. The sampling conducted may be inadequate to characterize the Site 9 groundwater for risk assessment purposes. The adequacy of these wells to characterize potential site contamination at Site 9 should be presented in the text, and additional sample collection may be necessary.

   Response: Comment noted. These issues will be resolved in the basewide groundwater i

3. **Section 6.2.3.2, Page 6-4**. The text states that two groundwater samples were collected from Site 10 and references Figure 3-4. According to the List of Figures, Chapter 3 does not contain a Figure 3-4. It appears that Figure 3-3 was intended. Appropriate changes should be made to the text.

   Response: The text will be changed accordingly.

   In addition, it appears from Figure 3-3 that only monitoring well WHF-10-2 is located within the Site 10 boundaries. According to Figures 5-1 and 5-2, monitoring well WHF-10-1 may be located cross gradient from Site 10. The sampling conducted may be inadequate to characterize the Site 10 groundwater for risk assessment purposes. The adequacy of these wells to characterize potential site contamination at Site 10 should be presented in the text, and additional sample collection may be necessary.

   Response: Comment noted. These issues will be resolved in the basewide groundwater investigation of Site 40.

4. **Figure 6-1, Page 6-18**. The figure presents the conceptual site model for Sites 9 and 10. According to the text presented in Chapter 6.0, the Current Resident scenario included in this figure was not evaluated in the Human Health Risk Assessment (HHRA). Also, the figure does not indicate that Future Resident groundwater exposure was evaluated in the HHRA. The figure should be amended to be consistent with the text.

   Response: The Figure will be revised to be consistent with the text.

5. **Section 6.3.2, Page 6-19**. The text states that subsurface soil samples were not collected at Site 9 "based on previous surface soil sample results and the surface soil assessment." However, COPCs were selected for surface soil and for groundwater at Site 9, indicating that potential COPCs may be present in subsurface soil. The conceptual site model and Table 6-7 indicates that an excavation worker scenario is evaluated for Site 9. Therefore, the lack of subsurface soil data is a potential data gap in the HHRA evaluation of Site 9. An absence of COPCs in subsurface soil can not be assumed. The potential data gap concerning subsurface soil data for Site 9 should be discussed in greater detail in the text, and additional sampling may be required.

   Response: The potential data gap will be explained in the final RI.

6. **Section 6.6, Page 6-51, First Bullet**. The uncertainty section indicates that PAHs present in samples at Site 10 may be due to anthropogenic sources that are not site related. The potential sources referred to are described in the text of the HHRA. Because the RI Report recommends NFA, potential sources of PAHs that are related to human activity but are not related to site activities should be discussed in greater detail.

   Response: The RI report recommendation has been revised to prepare an FS and therefore addresses PAHs in surface soil.

7. **Section 6.8**. The title of this section is "Summary of HHRA for Site 9 and 10." However, only carcinogenic risks are summarized in this section. The noncarcinogenic hazards should also be discussed. It should be clearly noted that the total HIs for the future child receptors at both Sites 9 and 10 exceed 1.

   Response: Noncarcinogenic risks will be included in the summary of the HHRA.

8. **Section 7.3.2, Pages 7-17 to 7-19, Table 7-4**. 4,4-DDE is not included in Table 7-4, the Selection of Ecological Chemicals of Potential Concern for Surface Soil associated with Site 10. 4,4-DDE was detected in the surface soil at Site 10 and is listed as a contaminant in Tables 5-10 and 5-11. 4,4-DDE should be included in Table 7-4.

Response: If appropriate, 4,4-DDE will be included in Table 7-4.

9. **Section 7.4.2, Page 7-21.** No herbivorous bird species was included as a receptor in the ERA. It is probable that herbivorous avian species are found at Sites 9 and 10 and that the calculated risks to these species are different than those to the Eastern Meadowlark, which consumes approximately 20% of its diet as plant materials. An herbivorous bird species should be included as a receptor in the ERA.

   Response: A herbivorous bird species will be included as a receptor in the ERA.

10. **Section 7.4.2, Page 7-29, Table 7-8**. Footnote 1 states that the bioaccumulation factors (BAFs) for plant material are based on the assumption that plants are 80% water. This assumption applies to berries and leafy vegetables, but does not apply to grains, which have a moisture content of only 10%. Since the diet of the cotton mouse may consist primarily of grains, the risks to the cotton mouse may be underestimated. This source of uncertainty should be discussed in the Uncertainty Analysis.

    Response: The source of uncertainty will be included as noted.

11. **Section 7.7, Page 7-39, Paragraph 2**. The text states that risks to adult amphibians and reptiles species were not estimated because bioaccumulation and toxicity data are lacking. Since quantitative exposure data are not available, a brief qualitative discussion of the anticipated risks to these groups should be included in the Uncertainty Analysis in addition to the current statement that quantitative risks were not estimated.

    Response: A qualitative discussion of anticipated risks will be included as noted.

12. **Section 9.1**. This section provides a summary of the human health risk assessment. However, only carcinogenic risks are summarized in this section. The noncarcinogenic hazards should also be discussed. It should be clearly noted that the total HIs for the future child receptors at both Sites 9 and 10 exceed 1.

    Response: The noncarcinogenic risks will be discussed as noted.

SPECIFIC COMMENTS REQUIRING ONLY ACTION TO CORRECT THE DOCUMENT

1. **Section 7.6.2.2, Page 7-36, Line 35**. The text refers to Appendix H as containing linear regressions analyses of the results of the surface soil bioassays. The correct reference is Appendix I.

Response: The text will be changed as noted.